

REVISION NOTICE

THESE ARE SUPERSEDING OR SUPPLEMEN-
TARY PAGES TO SAME PUBLICATION OF
PREVIOUS DATE

Insert these pages into basic publication
Destroy superseded pages

RESTRICTED

AN 01-85FA-1

Pilot's Handbook

for

NAVY MODEL

F7F-1N • F7F-2N

F7F-3 • F7F-3N

F7F-4N

Airplanes

THIS PUBLICATION SUPERSEDES AN 01-85FA-1 DATED 1 MAY 1946

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE
AND THE CHIEF OF THE BUREAU OF AERONAUTICS

Appendix I and II of this publication shall not be carried in aircraft on combat missions or when there is a reasonable chance of its falling into the hands of the enemy

NOTICE.—This document contains information affecting the national defense of the United States within the meaning of the Espionage Act, 50 U. S. C., 31 and 32, as amended. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

RESTRICTED

15 September 1947

Revised 1 July 1949

Reproduction of the information or illustrations contained in this publication is not permitted without specific approval of the issuing service. The policy for use of Classified Publications is established for the Air Force in AFR 205-1 and for the Navy in Navy Regulations, Article 1509.

LIST OF REVISED PAGES ISSUED

INSERT LATEST REVISED PAGES. DESTROY SUPERSEDED PAGES.

NOTE: The portion of the text affected by the current revision is indicated by a vertical line in the outer margins of the page.

Page No.	Date of Latest Revision	Page No.	Date of Latest Revision
i	1 July 1949	65	1 July 1949
ii	1 July 1949	66	1 July 1949
iiA	1 July 1949	67	1 July 1949
iiB	1 July 1949	68	1 July 1949
1	1 July 1949	69	1 July 1949
3	1 July 1949	70	1 July 1949
19	1 July 1949	71	1 July 1949
20A	1 July 1949	72	1 July 1949
20B	1 July 1949	73	1 July 1949
28A	1 July 1949	74	1 July 1949
33	1 July 1949	75	1 July 1949
34	1 July 1949	76	1 July 1949
34A	1 July 1949	77	1 July 1949
34B	1 July 1949	78	1 July 1949
40	1 July 1949	79	1 July 1949
41	1 July 1949	80	1 July 1949
48	1 July 1949	81	1 July 1949
49	1 July 1949	82	1 July 1949
55	1 July 1949	83	1 July 1949
56	1 July 1949	84	1 July 1949
57	1 July 1949	85	1 July 1949
58	1 July 1949	87	1 July 1949
59	1 July 1949	88	1 July 1949
60	1 July 1949	89	1 July 1949
61	1 July 1949	90	1 July 1949
62	1 July 1949	91	1 July 1949
63	1 July 1949	93	1 July 1949
64	1 July 1949	94	1 July 1949

* The asterisk indicates pages revised, added or deleted by the current revision.

ADDITIONAL COPIES OF THIS PUBLICATION MAY BE OBTAINED AS FOLLOWS:

BuAer

USAF ACTIVITIES.—In accordance with Technical Order No. 00-5-2.

NAVY ACTIVITIES.—Submit request to nearest supply point listed below, using form NavAer-140; NAS, Alameda, Calif.; ASD, Orote, Guam; NAS, Jacksonville, Fla.; NAS, Norfolk, Va.; NASD, Pearl City, Oahu; NASD, Philadelphia, Pa.; NAS, San Diego, Calif.; NAS, Seattle, Wash.

For listing of available material and details of distribution see Naval Aeronautics Publications Index NavAer 00-500.

TABLE OF CONTENTS

SECTION I		SECTION II	
DESCRIPTION		NORMAL OPERATING INSTRUCTIONS	
	Page		Page
1. AIRPLANE	1	1. BEFORE ENTERING THE COCKPIT	27
2. POWER PLANT	2	a. Flight Limitations and Restrictions	27
a. General	2	b. Obtain Gross Weight	28A
b. Power Plant Controls	2	c. Entrance to Airplane	28A
3. FUEL SYSTEM	5	2. ON ENTERING THE PILOT'S COCKPIT	28A
a. Fuel Specification	5	a. Standard Check For All Flights	28A
b. Tanks and Capacities	5	b. Special Check For Night Flights	28A
c. Fuel System Controls	6	3. FUEL AND OIL SYSTEM MANAGEMENT	28A
d. Revised Fuel System and Controls	10	a. Fuel System—Ser. No. 80259-80607 Incl.	28A
4. OIL SYSTEM	11	b. Fuel System—Ser. No. 80608 and Subs.	29
a. Oil Specification	11	c. Operation of Oil System	29
b. Description	11	4. STARTING ENGINES	29
c. Oil System Controls	11	5. WARM-UP AND GROUND TEST	30
5. FLIGHT CONTROLS	11	6. SCRAMBLE TAKE-OFF	31
a. Aileron and Elevator Controls	11	7. TAXIING INSTRUCTIONS	31
b. Rudder and Brake Control Pedals	11	8. TAKE-OFF	32
c. Elevator, Aileron and Rudder Trim		9. ENGINE FAILURE DURING TAKE-OFF	32
Tab Controls	12	10. CLIMB	33
6. HYDRAULIC SYSTEM CONTROLS	12	11. GENERAL FLYING CHARACTERISTICS	33
a. General	12	12. STALLS	34A
b. Emergency Control—L.G. Extension and		13. SPINS	34A
Brake System	12	14. PERMISSIBLE ACROBATICS	34A
c. Landing Gear Control	12	15. DIVING	34A
d. Arresting Hook Control	13	16. NIGHT FLYING	35
e. Brake Control	13	17. APPROACH AND LANDING	36
f. Wing Flaps Control	14	18. STOPPING ENGINES	37
g. Wing Folding Controls	16	19. BEFORE LEAVING PILOT'S COCKPIT	38
h. Rudder Booster By-Pass Control	17	20. MOORING	38
i. Gun Charging Controls	17		
7. ELECTRICAL EQUIPMENT CONTROLS	17		
8. MISCELLANEOUS CONTROLS			
AND EQUIPMENT	19		
a. Cockpit Hoods	19		
b. Pilot's Seat and Harness	19		
c. Cockpit Heater and Defroster Controls	20		
d. Controls Lock	20		
e. Chartboards	20		
f. Map Cases	20		
g. Relief Tubes	20		
h. Anti-blackout Provisions	20		
i. Automatic Pilot, Type GR-1	20		

SECTION III

FLIGHT OPERATING DATA

AIRSPEED CORRECTION TABLE	39
POWER PLANT CHART	40-41

	<i>Page</i>
SECTION IV	
EMERGENCY OPERATING INSTRUCTIONS	
1. FIRE	43
2. ENGINE FAILURE	43
3. FORCED LANDINGS	43
4. EMERGENCY L. G. OPERATION	44
5. EMERGENCY BRAKE SYSTEM OPERATION	45
6. EMERGENCY ESCAPE FROM AIRPLANE ..	45
7. EMERGENCY OPERATION OF ELECTRICAL SYSTEM	45
8. EMERGENCY OPERATION OF HYDRAULIC SYSTEM	45
9. EMERGENCY OPERATION OF FUEL SYSTEM	48
10. EMERGENCY OPERATION OF CONTROLS	48

SECTION V	
OPERATIONAL EQUIPMENT	
1. ARMAMENT	49
a. Gunnery	49
b. Bombing Equipment	51
c. Rocket Projectile Provisions	52
d. Miscellaneous Equipment	52
2. OXYGEN	53
a. Cylinder and Control	53
b. Regulator	53
c. Preflight Check List	53
d. Operating Instructions	54
3. COMMUNICATION AND ELECTRONIC EQUIPMENT	55

	<i>Page</i>
a. Communication Equipment Model F7F-1 Airplane	55
b. Radar Equipment (AN/APS-6) Model F7F-1 Airplane	59
c. Communication Equipment Model F7F-2N Airplane	60
d. Radar Equipment—Model F7F-2N Airplane	65
e. Communication Equipment—Model F7F-3 Airplane	66
f. Communication Equipment Model F7F-3N Airplane	67
g. Radar Equipment—Model F7F-3N	69
h. Communication Equipment Model F7F-4N Airplane	74
i. Radar Equipment—Model F7F-4N Airplane	77
4. RADAR OPERATOR'S COCKPIT	78

APPENDIX I	
OPERATING CHARTS, TABLES, CURVES AND DIAGRAMS	
Protection Against Gunfire Diagram	87
Take-Off, Climb and Landing Chart	88,89
Dive Angle vs. Angle of Attack	90
Stalling Speed vs. Weight (Power Off)	90
Angle of Attack vs. Indicated Airspeed Curves	91
Operation Flight Strength Diagram	91
Engine Calibration Curves	93,94

APPENDIX II	
Preliminary Supplementary Operating Instructions	95

ILLUSTRATIONS

<i>Figure</i>	<i>Page</i>	<i>Figure</i>	<i>Page</i>
1. F7F-1N Airplane— $\frac{3}{4}$ Rear View—R. H. Side	iii	34. Interior Arrangement Diagram	25
2. F7F-2N Airplane— $\frac{3}{4}$ Front View—L. H. Side (Wings Folded)	iii	35. Ladder and Steps	28A
3. F7F-3 Airplane— $\frac{3}{4}$ Rear View—R. H. Side	iv	36. Airspeed Installation Correction Table	39
4. F7F-3N Airplane — $\frac{3}{4}$ Front View—R. H. Side	iv	37. Power Plant Chart	40-41
4A. F7F-4N Airplane— $\frac{3}{4}$ Front View R.H. Side	ivA	38. Landing Gear Emergency Dump Control and Brake Air Gage	44
5. Engine Control Quadrant	2	39. Emergency Brake Control	45
6. Ignition Switch	2	40. Hydraulic Hand Pump and Panel	46
7. Primer and Starter Switches	3	41. Emergency Controls	47
8. Cowl Flaps, Carburetor Air and Oil Cooler Exit Duct Doors Controls	4	42. Rudder Booster By-Pass Control	48
9. Propeller Feathering Controls	4	43. Gun Charging Controls	49
10. Fuel System Controls	6	44. Armament Control Switches	49
11. Fuel System Diagram	7	45. Armament Installation	50
Ser. No. 80259-80607 Incl.	7	46. Gunsight Light Control	51
12. Fuel System Control Diagram	8	47. Manual Bomb Release Handles	51
Ser. No. 80259-80607 Incl.	8	48. Tow Target Control	52
13. Tank Pressurizing Release Handle	9	49. Pilot's Oxygen Cylinder Control	53
14. Fuselage Droppable Tank Manual Release	9	50. Oxygen Regulator	53
14A. Fuel System Controls	10A	51. Oxygen Equipment Diagram	54
Airplane Ser. No. 80608 and Subs.	10A	52. Communicating Controls (F7F-1N Airplane)	56
14B. Fuel System Diagram	10C	53. Pilot's Communicating Controls (F7F-2N Airplane)	57
Airplane Ser. No. 80608 and Sub.	10C	54. Radar Operator's Communicating Controls (F7F-2N Airplane)	58
14C. Fuel System Control Diagram	10D	55. Pilot's Communicating Controls (F7F-3 Airplane)	59
Airplane Ser. No. 80608 and Subs.	10D	55A. Pilot's Communicating Controls (F7F-3N Airplane)	60
15. Oil System Diagram	10F	55B. Pilot's Communicating Controls (F7F-4N Airplane)	61
16. Pedal Adjustment Ratchet	11	55C. Pilot's Radar Indicator and Controls (F7F-1N and F7F-2N Airplanes)	62
17. Tabs Controls Unit	12	55D. Radar Auxiliary Control (SA-38/APA-32) L.H. Side (F7F-2N Only)	63
18. Landing Gear Control	13	55E. Pilot's Radar Indicator and Controls (F7F-3N Airplane)	64
19. Arresting Hook Control	13	56. VHF Range vs. Altitude	67
20. Wing Flaps Control	14	56A. Pilot's Radar Indicator and Controls (F7F-4N Airplane)	75
21. Hydraulic System Diagram	15	57. Radar Operator's Cockpit—L.H. Side (F7F-2N Only)	79
22. Wing Folding Control	16	58. Radar Operator's Cockpit—R.H. Side (F7F-2N Only)	80
23. Wing Folding Safety Lock Control	16	58A. Radar Operator's Cockpit—L.H. Side (F7F-3N Only)	81
24. Pilot's Switch Box	17	58B. Radar Operator's Cockpit—L.H. Side (F7F-4N Only)	81
25. Radar Operator's Cockpit Hood	18	58C. Radar Operator's Cockpit—R.H. Side (F7F-3N Only)	82
26. Pilot's Cockpit Hood	18	58D. Radar Operator's Cockpit—R.H. Side (F7F-4N Only)	82
27. Pilot's Heater and Defroster Control	19	59. Radar Operator's Cockpit—Looking Forward (F7F-2N Only)	83
28. Pilot's Seat and Harness	19		
29. Controls Lock	20		
29A. Cockpit Heater and Defroster Instal.	20A		
29B. Auto. Pilot (Type GR-1) System Diagram	20B		
30. Pilot's Main Instrument Panel	21		
31. Pilot's Lower and Right Side Instrument Panels—(Ser. Nos. 80259-80607 Incl. only)	22		
31A. Pilot's Lower and Right Side Instrument Panels—(Ser. No. 80608 and Subs.)	22A		
31B. Pilot's Cockpit—L.H. Side (Ser. No. 80608 and Subs)	22B		
32. Pilot's Cockpit—L.H. Side (Ser. Nos. 80259-80607 Incl. only)	23		
33. Pilot's Cockpit—R. H. Side	24		

59A. Radar Operator's Cockpit—Looking Forward (F7F-3N Only)	84	63. Dive Angle vs. Angle of Attack	90
59B. Radar Operator's Cockpit—Looking Forward (F7F-2N Only)	85	64. Stalling Speed vs. Weight (Power Off)	90
60. Protection from Gunfire Diagram	87	65. Angle of Attack vs. Indicated Airspeed	91
61. Take-Off, Climb and Landing Chart	88-89	66. Operating Flight Strength Diagram	91
		67. Engine Calibration Curves	93-94



Figure 1—F7F-1N Airplane— $\frac{3}{4}$ Rear View—R. H. Side



Figure 2—F7F-2N Airplane— $\frac{3}{4}$ Front View—L. H. Side (Wings Folded)



Figure 3—F7F-3 Airplane— $\frac{3}{4}$ Rear View—R. H. Side



Figure 4—F7F-3N Airplane— $\frac{3}{4}$ Front View—R. H. Side



Figure 4A—F7F-4N Airplane— $\frac{3}{4}$ Front View R. H. Side



SECTION I DESCRIPTION

MAIN DIFFERENCES F7F SERIES AIRPLANES

DIFFERENCE	F7F-1N	F7F-2N	F7F-3	F7F-3N	F7F-4N
EXTERNAL FEATURES	Single Place	Two Place	Single Place Larger Vertical Fin	Two Place Larger Vertical Fin Larger Nose Fairing	Two Place Larger Vertical Fin
ENGINE MODEL	R2800-22W or -34W	R2800-22W or -34W	R2800-34W	R2800-34W	R2800-34W
FUEL TANK CAPACITY (GALLONS)	Main 210 Reserve 150 Aux. 60 Total 420 Droppable 600	Main 210 Reserve 105 Aux. 60 Total 375 Droppable 600	Main 210 Reserve *185 Aux. 60 Total 455 Droppable 600 *Removable Reserve 80	Main 210 Reserve 105 Aux. 60 Total 375 Droppable 600	Main 210 Reserve 105 Aux. 60 Total 375 Droppable 600
MAXIMUM ARMAMENT	4 .50 Cal. 1600 Rounds 4 20 mm Cannon 800 Rounds 1 2000# Bomb 2 1000# Bombs	4 .50 Cal. 1600 Rounds 4 20 mm Cannon 800 Rounds 1 2000# Bomb 2 1000# Bombs 8 5 Rockets	4 .50 Cal. 1600 Rounds 4 20 mm Cannon 800 Rounds 1 2000# Bomb 2 1000# Bombs 8 5 Rockets	4 20 mm Cannon 800 Rounds 1 2000# Bomb 2 1000# Bombs 8 5 Rockets	4 20 mm Cannon 800 Rounds 1 2000# Bomb 2 1000# Bombs 8 5 Rockets
STRUCTURE			Material Change (To permit man- euvers with in- creased wt.)	Material Change (To permit man- euvers with in- creased wt.)	Material Change (Wing, fuselage and landing gear strengthened)
RADAR EQUIPMENT	Radar Pilot Operated	Radar (two man)	Day Fighter Equipment	SCR-720 Radar (two man)	AN/APS-19 (two man)
NORMAL GROSS WEIGHT	21400	21700	22000	21700 (including 80 gal. reserve tank)	22000

1. AIRPLANE.

The F7F series airplanes are twin engine, folding, high mid-wing fighters (class VF) equipped with tri-cycle landing gear and designed to operate from aircraft carriers and from regular landing fields. The landing gear, arresting hook, wing flaps, wing folding, brakes, rudder booster and gun chargers are operated hydraulically. The oil cooler duct doors, carburetor air duct doors and cowl flaps are operated electrically.

The F7F-1N model (single seater) carries a normal fuel load of 420 gallons in three self-sealing cells in the fuselage.

The F7F-2N model (two seater—second cockpit for navigator-radar operator) carries a normal fuel load of 375 gallons in three self-sealing cells. A spare kit, made up of a removable self-sealing tank of 80 gallons capacity with the necessary lines and fittings is supplied for use when the second cockpit is not manned.

The F7F-3 model (single seater—80 gallon removable tank in second cockpit) carries a normal fuel load of 455 gallons in four self-sealing cells in the fuselage.

The F7F-3N and -4N models carry a normal fuel load of 375 gallons in three self-sealing cells. The four .50 caliber machine guns are eliminated in these models because of the radar installation.

The armament, except as noted above consists of four .50 cal. machine guns installed in the forward section of the fuselage and four 20 mm. cannon installed in the wing inner panels. Provision is made to install eight five inch rockets, four under each wing outer panel on airplane Serial No. 80294 and subsequent. A gun camera is installed in the leading edge of the left wing. Three bomb racks and fittings are installed, one in the fuselage and one under each wing inner panel.

Normal Weight—F7F-1N	21400
F7F-2N	21700
F7F-3	
F7F-3N	
F7F-4N	

Span (Wings Spread)	51' 6"
(Wings Folded)	32' 2"
Fuselage Length	44' 8½"
Height (Over Tail at Rest)	
Serial Nos. 80259-80364	14' 6½"
Serial No. 80365 and subsequent	15' 8½"

2. POWER PLANT.

a. GENERAL. — F7F-1N and F7F-2N airplanes, Serial Nos. 80259-80358 inclusive were equipped with R2800-22W single stage, two speed, supercharged engines. F7F-3 airplanes, Serial No. 80359 and subsequent were equipped with R2800-34W engines. These engines are installationally interchangeable—the -34W model has an improved high blower performance.

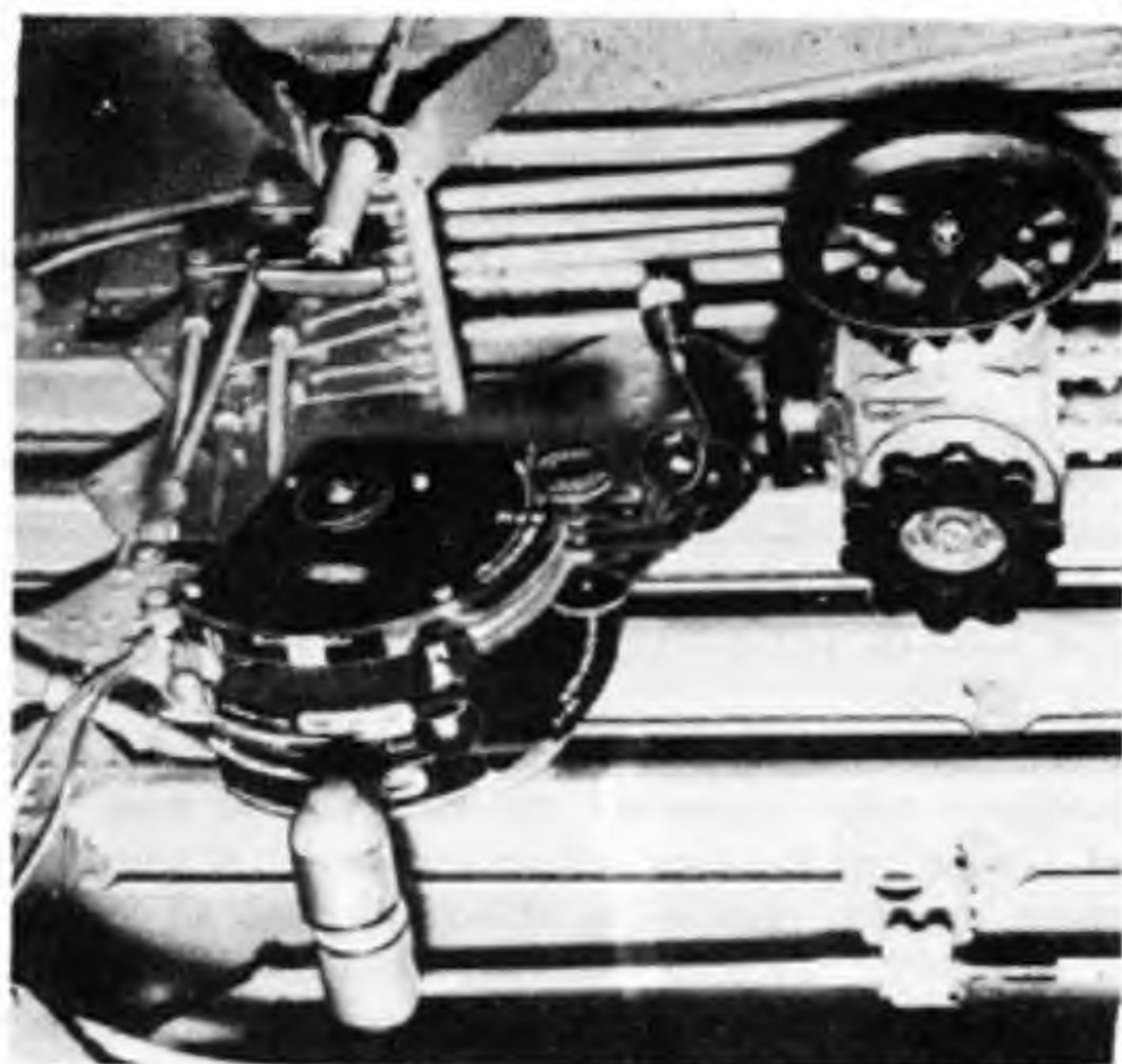


Figure 5—Engine Control Quadrant



Figure 6—Ignition Switch

Full feathering, three bladed, Hamilton Standard Hydromatic propellers are used in both installations. Refer to Section III for operating instruction for each engine.

b. POWER PLANT CONTROLS.

(1) CONTROL QUADRANT.—The quadrant, located on the left hand side of the cockpit, carries the following controls:

(a) BOOST CONTROL (THROTTLE) LEVERS.—Large handles (paired) on top of quadrant. In-board lever (right engine) carries microphone switch button. Airplanes not equipped with manifold pressure regulators have conventional throttles.

1. Move FORWARD to OPEN.
2. Move AFT to CLOSE.

In airplanes equipped with manifold pressure regulators, the throttle levers become "boost control" levers, and are used to set the regulators to maintain the manifold pressure desired. Once set in this manner, the regulators automatically control the carburetor throttles to maintain constant manifold pressure at any altitude below critical altitude. Above critical altitude, manifold pressure will vary just as it does at full throttle when a conventional throttle is used. The pilot is relieved of controlling manifold pressure as he changes airspeed, altitude or rpm, except that he must observe manifold pressure limits when setting the boost control levers and must guard against excessive manifold pressure when rpm is reduced. Forward movement of the boost control levers increases manifold pressure settings, aft motion reduces them. No harm will result from advancing the boost control levers to full forward position for take-off or military power, provided the water injection switch is "OFF", because the maximum manifold pressure available is controlled by the manifold pressure regulators.

With manifold pressure regulators installed, the throttle levers are connected to the regulators which in turn are connected to the throttles on the carburetors. The pilot sets the regulators for the desired manifold pressure through movement of the throttle levers in the cockpit, and the regulators by hydraulic servo operation of the carburetor maintain this setting for him. To do this, the regulators obtain hydraulic power from the main engine oil pressure. As a safety precaution the unit is so designed that in the event of failure of the oil supply to the regulator the pilot will have manual control of the throttle below 47" Hg. in high blower and 41" Hg. in low blower at 2800 rpm.

The manifold pressure limits allowed by the regulators on R-2800-22W engines are as follows:

- Low Blower—Military Power— 58" Hg.
- High Blower—Military Power—48.5" Hg.
- Low Blower—Combat Power— 66" Hg.
- High Blower—Combat Power—60.0" Hg.

The manifold pressure limits allowed by the regulators on R-2800-34W engines are as follows:

- Low Blower—Military Power—58" Hg.
- High Blower—Military Power—49.5" Hg.
- Low Blower—Combat Power—65" Hg.
- High Blower—Combat Power—66" Hg.

It should be noted that when making a military or rated power climb, the pilot can shift from low to high blower and the regulator will automatically reset the manifold pressure to the required value without requiring a change in the position of the boost (throttle) controls.

(b) MIXTURE LEVERS. — Marked (M) (paired) on inboard side.

1. Move CENTRALLY to AUTO LEAN,

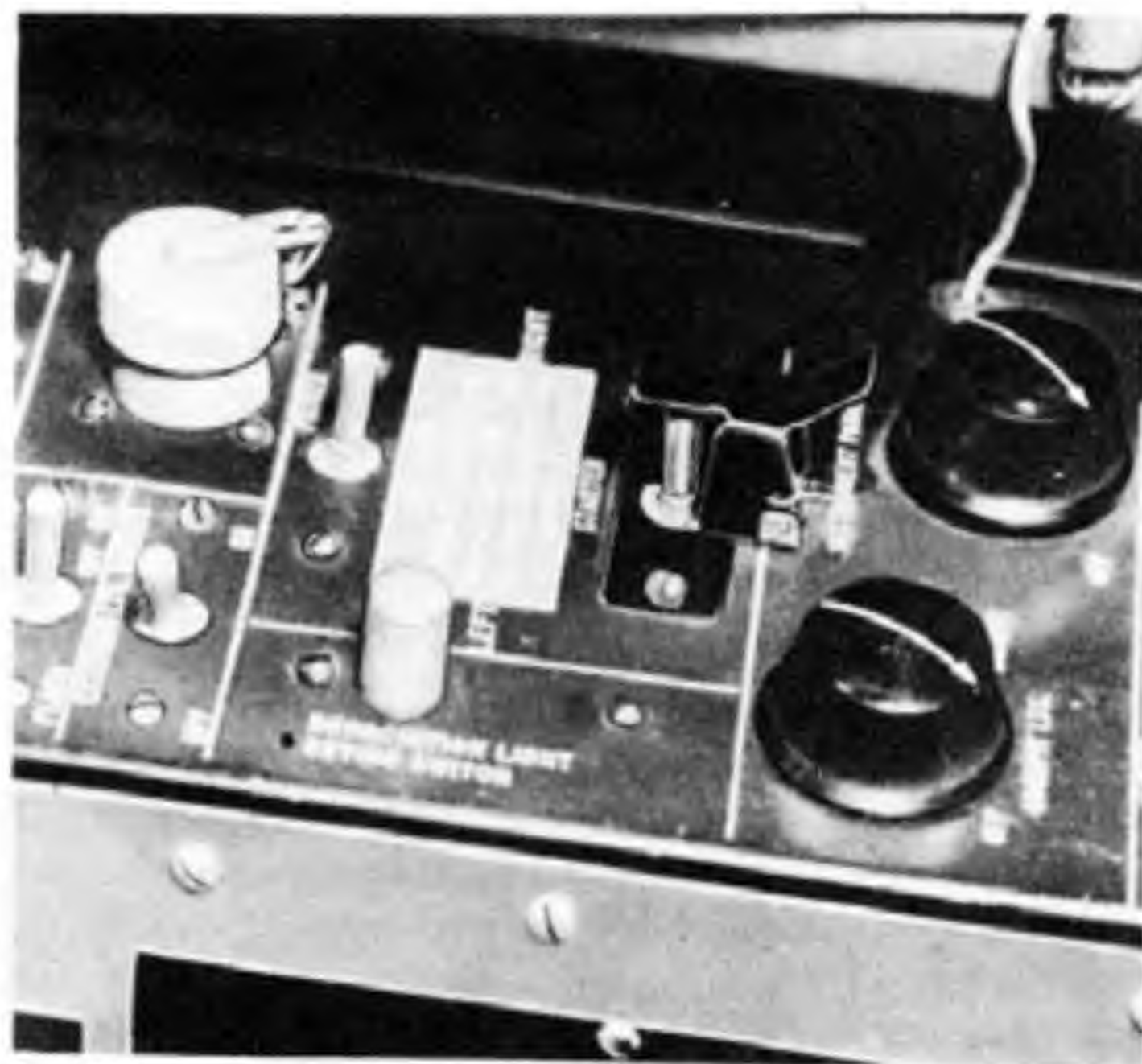


Figure 7—Primer and Starter Switches

Revised 1 July 1949

and FULL FORWARD to AUTO RICH.

2. FULL AFT to extreme aft sector (red) to IDLE CUT-OFF. Check for proper rigging in AUTO LEAN and AUTO RICH.

(c) PROPELLER LEVERS. — Marked (P) (paired) aft of throttle levers.

1. Move UP to DECREASE RPM.
2. Move DOWN to INCREASE RPM.

(d) VERNIER CONTROL.—Knobs adjacent to levers, for synchronization.

1. Rotate CLOCKWISE to DECREASE RPM.

2. Rotate COUNTER-CLOCKWISE to INCREASE RPM.

(e) SUPERCHARGER LEVER. — On small quadrant outboard of propeller levers (one lever shifts both engines).

1. Move UP for HIGH BLOWER.
2. Move DOWN for LOW BLOWER.

(2) IGNITION SWITCH (BOTH ENGINES). —The switch is located on the left hand side panel.

(a) Master control — push-pull handle—push to ON—pull to OFF (CUT).

(b) Separate switch handles for each engine—three positions of each—L. Magneto, R. Magneto, both.

(3) PRIMER AND STARTER CONTROLS.

(a) GENERAL.—The primer and starter control switches are located on the top of the electrical distribution panel, primer switch forward, starter switch (with safety cap) aft.

Note

F7F-1 airplanes, serial Nos. 80259, 80260 and 80261 have Type III BR cartridge starters on the engines. The cartridge is fired electrically when the switch is moved to ON. The starter breeches are accessible for loading through the main wheel wells. Eight spare cartridges for each engine are stowed in containers adjacent to the starter breeches.

A direct cranking electric starter is installed on each engine and is controlled by a starter switch on the pilot's switch box on the right hand side of the cockpit. The switch when closed energizes a relay which in turn allows current to operate the starter.

(b) PRIMER SWITCH — (FORWARD SWITCH).—Flick intermittently to prime.

To LEFT for LEFT ENGINE.

To RIGHT for RIGHT ENGINE.

(c) STARTER SWITCH—(AFT SWITCH).—Equipped with safety cap—lift safety cap and hold switch ON.

To LEFT for LEFT ENGINE.

To RIGHT for RIGHT ENGINE.

Note

Since ignition booster is energized only while switch is ON, hold starter switch ON until engine turns under own power, to utilize booster facilities.

CAUTION

1.

Continuous cranking must not exceed one minute. If the engine does not start, open the starter switch and allow the starter to cool for at least one minute. If the engine fails to start after the second attempt, check the engine.

2.

When the airplane battery is used as the source of power for starting, the engine must not be cranked continuously more than 30 seconds with a 30 second rest period before the next cranking.

(4) COWL FLAPS CONTROL.

(a) **GENERAL.**—The cowl flaps control switch is located on the upper left side of the lower control panel.

(b) OPERATION.

1. Switch UP—AUTOMATIC operation.
2. Switch to CENTER—OFF.
3. Switch DOWN to LEFT—MANUAL operation—cowl flaps OPEN.
4. Switch DOWN to RIGHT — MANUAL operation—cowl flaps CLOSED.

Movement of the cowl flaps is effected by electric screw jacks. When the switch is in AUTOMATIC, the motors operating the screw jacks are con-



Figure 8—Cowl Flaps, Carburetor Air and Oil Cooler Exit Duct Doors Controls



Figure 9—Propeller Feathering Controls

trolled by thermostats; as cylinder head temperatures increase, the cowl flaps are opened and as temperatures decrease the flaps close. The OFF position is to be used only in case of malfunctioning of the system or damage, and when the engine is stopped on the ground. In case of malfunctioning of the thermostats, or for other reasons, the cowl flaps can be operated by the pilot (switch in MANUAL) in accordance with instrument readings and visual inspection of the flap settings.

Note

To obtain intermediate settings, manually—switch to MANUAL, OPEN or CLOSED, as desired, then switch to OFF position when desired flap position is reached.

(5) CARBURETOR AIR CONTROL.

(a) **GENERAL.**—The carburetor air control switch is located on the lower panel above the oil cooler exit door and cowl flap control switches.

(b) OPERATION.

1. Switch UP to RIGHT—DIRECT (air under ram through duct from leading edge).
2. Switch LEFT—ALTERNATE (heated air from engine compartment).
3. Switch to CENTER—OFF.

The normal carburetor air (for each engine) is taken from an opening in the wing leading edge outboard of the nacelle and carried inboard through a duct in the leading edge and down into the carburetor. A door or butterfly valve operated by an electric screw jack is installed in the duct; when the switch is set at DIRECT, the door is horizontal and acts as a vane for air to the carburetor; when the switch is set at ALTERNATE, the door is swung to

block this source and a secondary door in the bottom of the duct is opened by engine suction to admit air from the engine accessory compartment. A small backfire relief door, installed in the butterfly valve plate, will open under the force of a backfire, when operating in ALTERNATE (duct blocked off). The OFF position of the switch is to be used only when the system is damaged or when the engines are stopped on the ground.

Note

Filtered air setting of switch on early models is inoperable—filters are not installed.

(6) PROPELLER FEATHERING CONTROLS.

(a) GENERAL.—The propeller feathering controls are located at the top center of the lower control panel (two controls—one each engine).

1. To FULL FEATHER—PUSH CONTROL IN AND RELEASE.

2. To UNFEATHER—PUSH CONTROL IN AND HOLD UNTIL RPM REACHES 1200, THEN RELEASE.

A circuit breaker reset button is located between these controls and should be checked for IN position. The controls operate electric pumps located in the nacelles which generate oil pressure to feather the blades. The oil supply is drawn through special lines from the oil tanks. Accumulators of 515 cu. in. capacity are installed in the propeller feathering oil lines to maintain pressure.

CAUTION

On unfeathering cycle, if button is held too long, propeller will feather again.

(7) WATER INJECTION SYSTEM CONTROL.

(a) The single toggle switch for control of the pumps for the anti-detonant equipment (one system for each engine) is located on the lower instrument and control panel, to the right of the fuel booster pump switch.

1. Move switch to RIGHT to ON.

2. Move switch to LEFT to OFF.

WARNING

To prevent water injection system pump from burning out, set switch to OFF as soon as fluid supply is exhausted.

Supply sufficient for five minutes (approx.) operation. Sharp drop in manifold pressure indicates that fluid supply has been exhausted.

Note

Water injection systems have been made inoperable in airplanes lacking manifold pressure regulators.

(b) The maximum tank capacity is 16 gallons (each tank). Each system consists of a tank, a pump, a water regulator, tubing and electric lines installed

in the engine nacelle. When the switch is set at ON, fluid (Spec. AN-A-24) is pumped from the tank forward to the regulator unit mounted on the engine. A limit switch, installed on the throttle, opens solenoids to allow the fluid to flow to the blowers in the engines when the throttle is moved to FULL FORWARD.

3. FUEL SYSTEM.

a. FUEL SPECIFICATION AN-F-28.

b. TANKS AND CAPACITIES.—The normal fuel supply is carried in three (four) self-sealing cells installed in the fuselage. The MAIN and RESERVE cells are installed in the fuselage tank section aft of the pilot's cockpit—the AUXILIARY cell is installed in the nose; these three cells are similar in design, each being made up of a self-sealing liner supported in a soft hammock bolted to an aluminum alloy top-plate assembly. The fourth cell (80 gal. removable reserve) is a rigid non-metallic self-sealing cell installed to the reserve cell (day fighters only).

The normal fuel supply of the F7F-1N airplanes, Serial No. 80259 to No. 80293 inclusive, is 420 U.S. gals. (350 Imp. gals.); the normal fuel supply of the F7F-2N and -3N airplanes, (night fighters) is 375 U.S. gals. (312.5 Imp. gals.). The reduction in fuel supply in these airplanes is due to the introduction of the second cockpit over the reserve tank. A removable reserve tank of 80 U.S. gals. (66.5 Imp. gals.) capacity may be installed over the reserve tank if the second cockpit is not manned, increasing the normal fuel supply to 455 U. S. gals. (380 Imp. gals.). This tank is a standard installation for F7F-3 airplanes (day fighters).

TANK CAPACITIES

	F7F-1N	U.S. Gals.	Imp. Gals.
Main		210	175
Reserve		150	125
Auxiliary		60	50
Total		420	350
F7F-2 and -3 (Day Fighters)			
Main		210	175
Reserve (Includes 80 gal. removable)		185	154
Auxiliary		60	50
Total		455	379
F7F-2N, -3N and -4N			
Main		210	175
Reserve		105	87.5
Auxiliary		60	50
Total		375	312.5

Note

Paragraph c. following applies to airplanes ser. Nos. 80259 - 80607 incl. only. Paragraph d. applies to airplane 80608 and subs.



Figure 10—Fuel System Controls—Ser. Nos. 80259-80607 Incl. only

c. FUEL SYSTEM CONTROLS.—A de-fueling unit, strainer, electric auxiliary pump, tank selector and engine selector valves are installed in the fuselage below, and aft of the pilot's cockpit.

(1) FUEL QUANTITY GAGE.—Located on the right side of the pilot's lower control panel; has three indicators (main, reserve and auxiliary tank loads). The needle on the reserve tank dial registers FULL (185 gals.) only when the removable tank is installed.

(2) TANK SELECTOR VALVE.—The tank selector valve control handle is located on the lower control panel, and has six settings:

- (a) Pointer UP—MAIN tank.
- (b) Pointer UP to LEFT—RESERVE tank.
- (c) Pointer DOWN to LEFT—AUXILIARY tank.

WARNING

This auxiliary tank is not installed on airplanes Serial No. 80259 and no. 80260. Do not use this setting or fuel supply will be cut off.

(d) Pointer DOWN — FUSELAGE DROPPABLE tank (150 or 300 U.S. gals., 120 or 240 Imp. gals.).

(e) Pointer DOWN to RIGHT — WING DROPPABLE tanks (300 U. S. gals., 240 Imp. gals.).

Note

A stop is installed on the dial to prevent the pointer being set on droppable tank settings when these tanks are not installed.

(f) Pointer UP to RIGHT—fuel supply OFF.

A stop is installed on the dial between the WING DROPPABLE and OFF position. The pointer must be returned through the other settings.

(3) WING DROP TANKS SELECTOR SWITCH.—A three position toggle switch—LEFT, RIGHT and OFF is installed on the pilot's lower instrument panel below the tank and engine selector valves. A circuit breaker reset button is installed on the inboard face of the pilot's switch box forward of the recognition light switches. When the tank selector valve is set at WING DROP TANKS and the auxiliary pump is set at ON, this switch permits the use of fuel from the left or right drop tank as desired.

CAUTION

Since there is no indication of the amount of fuel remaining in a wing drop tank it is important that the pilot switch from an almost empty tank before starving the engines. Refer to Flight Operation Instruction Charts, Appendix, for the rate of consumption of Fuel for specific conditions.

(4) ENGINE SELECTOR VALVE.—The engine selector valve control is located on the lower control panel to the right of the tank selector valve.

- (a) Pointer UP—BOTH engines.
- (b) Pointer LEFT—LEFT engine only.
- (c) Pointer RIGHT—RIGHT engine only.
- (d) Pointer DOWN—OFF.

CAUTION

The fuel system is not a cross feed type, and the selector valve is installed to cut off flow to a damaged engine.

The engine selector valve should be kept on BOTH except in cases of engine failure, when fuel flow must be cut off from the inoperative engine, or, in testing.

(5) ELECTRIC AUXILIARY FUEL PUMP.—The auxiliary fuel pump switch is located on the lower panel above the selector valve controls.

- (a) Switch to LEFT—OFF.
- (b) Switch to RIGHT—ON.

The pump is located in the tank section and acts as a booster to the engine driven pumps. The warning light glows when pressure drops below 1" psi.

Operate the auxiliary pump to build up initial fuel pressure to start the engines, to maintain fuel pressure at altitude, during critical periods of fuel system operation such as take-off, high power operation, landing, droppable tanks, (fuel transfer), changing tanks and for emergency in case of failure of the engine driven pumps.

CAUTION

Operate the auxiliary fuel pump when changing tanks, to prevent loss of fuel pressure.

(6) FUEL TRANSFER SYSTEM.—The transfer system replaces fuel used from the reserve tank during warm-up and take-off, with fuel from the droppable tanks. The installation consists of a line from the

NOTE
FUEL SYSTEM OF F7F (2N, 3 AND 3N SHOWN AIRPLANES SERIAL Nos 80259 TO 80607 INCL)
FUEL SYSTEM OF F7F (1) SIMILAR, WITH THE FOLLOWING EXCEPTIONS
150-GAL. RESERVE TANK IN F7F (1)
NO REMOVABLE RESERVE TANK IN F7F (1)
REMOVABLE RESERVE TANK FOR F7F (2N) SUPPLIED AS SPARE PART

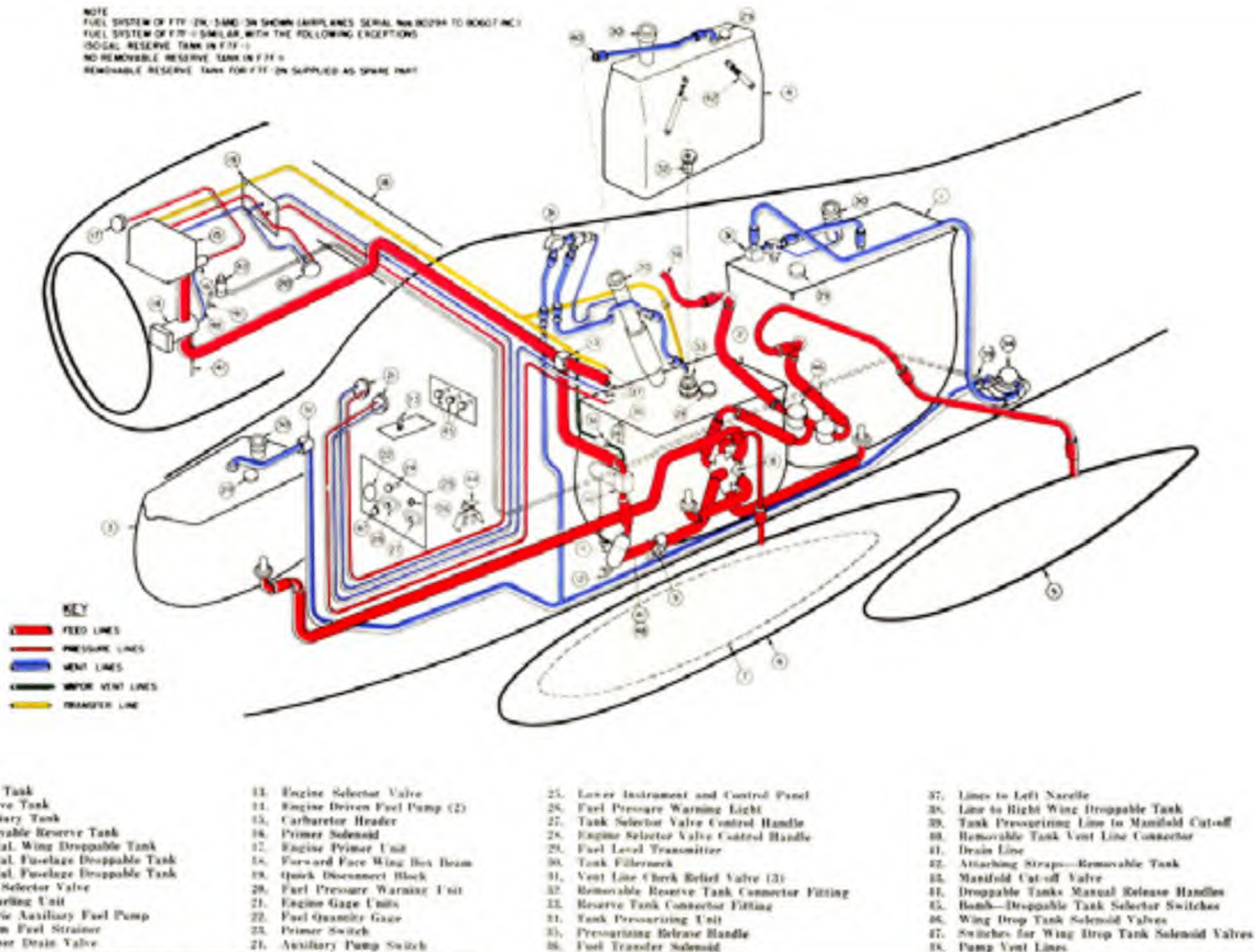


Figure 11—Fuel System Diagram—Ser. No. 80259-80607 Incl.

NOTE
FUEL SYSTEM OF F7F-2N, -3 AND -3N SHOWN (AIRPLANES SERIAL Nos 80294 TO 80607 INC.)
FUEL SYSTEM OF F7F-1 SIMILAR, WITH THE FOLLOWING EXCEPTIONS
150 GAL. RESERVE TANK IN F7F-1
NO REMOVABLE RESERVE TANK IN F7F-1
REMOVABLE RESERVE TANK FOR F7F-2N SUPPLIED AS SPARE PART

NOTE
WHEN REMOVABLE RESERVE TANK IS INSTALLED:
CONNECTOR FITTING "A" ENTERS CONNECTOR FITTING "B".
RESERVE TANK VENT LINE IS DISCONNECTED AT "C"
AND REMOVABLE RESERVE TANK VENT LINE "D" IS
CONNECTED IN ITS PLACE.
SWITCH "E" TAKES OVER FROM SWITCH "F" (FUEL TRANSFER)

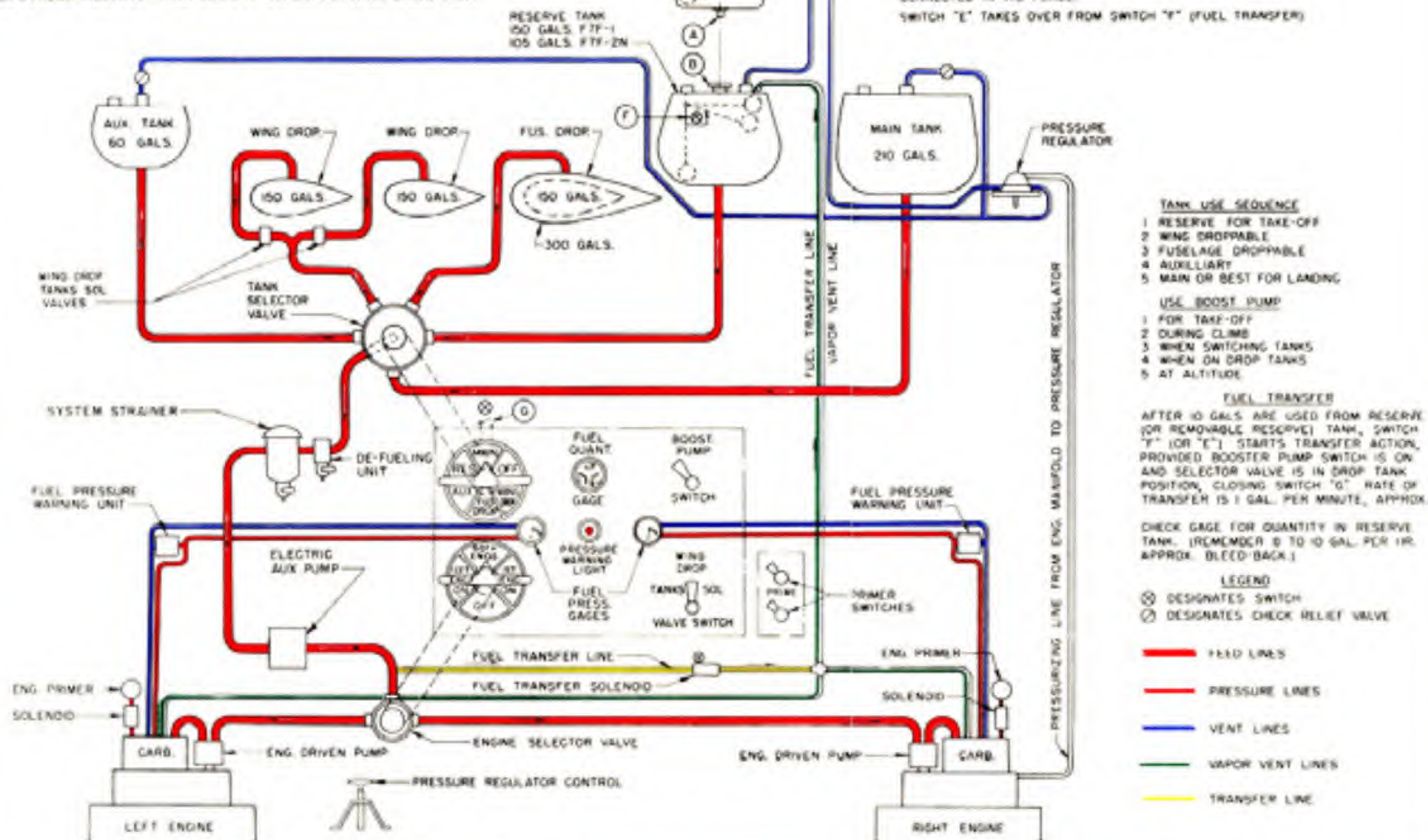


Figure 12—Fuel System Control Diagram Ser. No. 80294-80607 Inc.

automatic switch on the selector valve, an automatic switch on the liquid level indicator assembly on the reserve tank, a solenoid valve and electric wiring. When the selector valve handle is set at FUSELAGE OR WING DROPPABLE (if WING DROPPABLE setting is used, WING DROP TANK selector switch must be set to LEFT OR RIGHT, as desired), and the auxiliary pump switch is set at ON, this solenoid valve opens, and fuel flows from the strainer to the reserve tank until the tank is filled, when the level indicator float actuates the switch to break the circuit. If there is no space in the reserve tank for additional fuel, the level indicator switch will keep the circuit open, and the solenoid will not operate.

Note

Stops are installed on the face of the tank selector valve when no droppable tanks are carried to prevent setting the valve in either of these positions.

(7) TANK PRESSURIZING SYSTEM.—The pressure dome for the standard pressurizing system is located in the fuselage. The system maintains a pressure differential above atmospheric pressure at altitudes above 9,000 feet, effected by a syphon actuated by manifold pressure. Relief, regulator, and cut-off valves are installed in the system. The manual override or cut-off valve control is a "T" handle located on the cockpit bulkhead, to the left of the seat.

PULL "T" handle to "RELEASE."

PUSH "T" handle for "PRESSURE."

CAUTION

Pull "T" handle to "RELEASE" pressure if tank is damaged.

(8) DROPPABLE TANK RELEASE CONTROLS.—Fittings for the installation of one fuselage and two wing droppable tanks (600 gals. total capac-

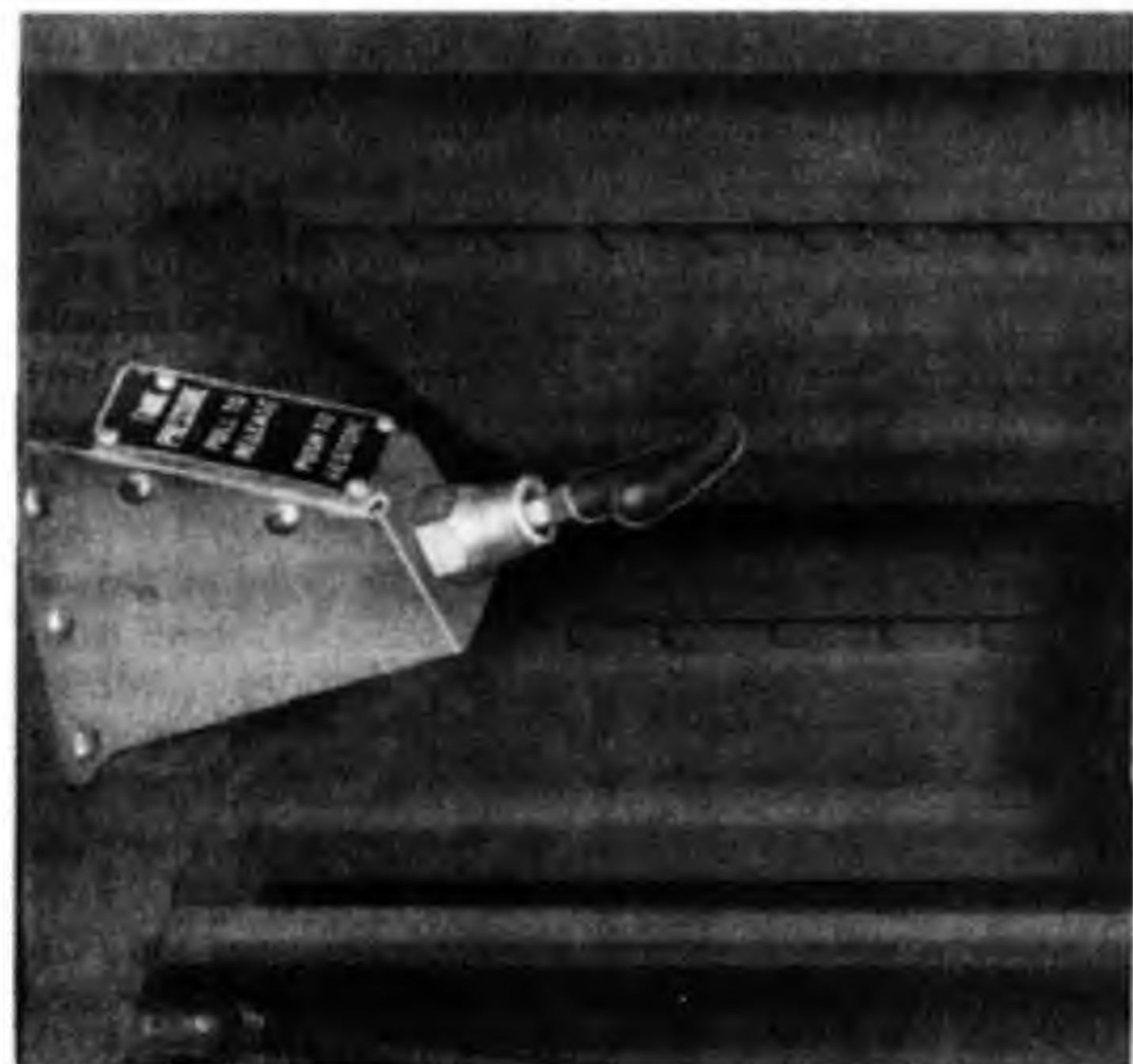


Figure 13—Tank Pressurizing Release Handle

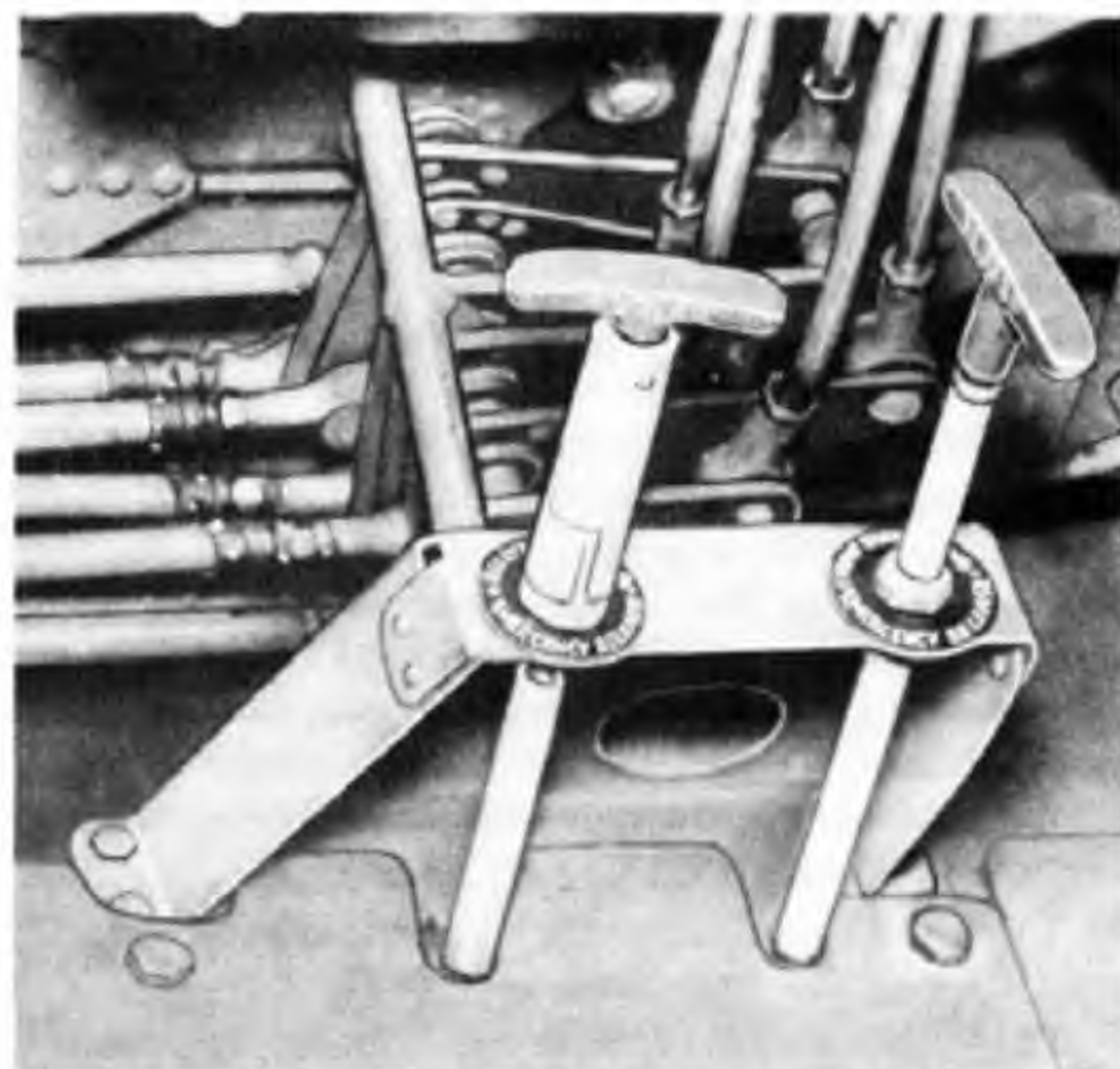


Figure 14—Droppable Tank Manual Release Handles

ity) are provided in both models.

(a) ELECTRICAL.—The tank release switches (left, right, center) and armament master switch (with safety cap) are located on the upper left hand corner of the main instrument panel; the thumb trigger is on the stick grip.

(b) TO RELEASE DROPPABLE TANKS ELECTRICALLY.

1. Fuel tank selector valve to MAIN, RESERVE, or AUXILIARY.
2. For fuselage tank only, pull manual release handle UP, until stopped, rotate $\frac{1}{4}$ turn clockwise.
3. Armament master switch to ON.
4. Switch for tank (or tanks) to be dropped—DOWN to RELEASE.
5. Press thumb trigger switch on top of stick grip.

(c) TO RELEASE FUSELAGE TANK (ONLY) MANUALLY.—Aft release "T" handle located on cockpit floor below engine control quadrant.

1. Fuel tank selector valve to MAIN, RESERVE, AUXILIARY or WING DROPPABLE.
2. Pull handle UP, until stopped by stud. ROTATE CLOCKWISE $\frac{1}{4}$ turn approximately, then PULL UP sharply.

Note

The manual release may be used after the electrical release, to insure release of the fuselage tank.

(d) TO RELEASE WING TANKS MANUALLY (JETTISON).—Forward release "T" handle located on cockpit floor below engine control quadrant.

1. Fuel tank selector valve to MAIN, RESERVE, AUXILIARY or FUSELAGE DROPPABLE.
2. Pull handle UP sharply.

d. REVISED FUEL SYSTEM AND OPERATION.—The revised fuel system installed in airplanes ser. No. 80608 and subs., provides the same tank arrangement as that in previous airplanes (paragraph *b.* above); however, under NORMAL OPERATION, the fuel flow from the three droppable, the auxiliary and reserve tanks is directed under pressure of a transfer pump to the main tank and from the main tank through two strainers (one each engine) two booster pumps (one each engine) to the engine driven pumps. All fuel passes through the main tank, so that a 210 gal. supply remains when all fuel in any selected tank has been exhausted. Under STAND-BY OPERATION, in case the main tank should be damaged, the fuel selector valves are set at STAND-BY and fuel from the selected tank by-passes the main tank and flows to the engines as in a NORMAL OPERATION.

In this system, the carburetor bleed-back (vapor vent) is led to the main tank.

With this system, fuel transfer takes place at all times, until fuel from all tanks other than the main has been used; i.e., the transfer pump operates continuously and automatically, when the FUEL SELECTOR VALVES are set at "ON". A red jewel TRANSFER WARNING LIGHT, installed beneath the plexiglas dial on the TANK SELECTOR VALVE CONTROL, glows when the pressure of fuel being transferred drops below 8 psi (with the transfer pump operating) to warn the pilot that the fuel supply from the selected tank is exhausted and that the selector must be set to another tank.

CAUTION

Warning light not operative when selector valves are set at "STAND-BY" or "OFF".

(1) FUEL QUANTITY GAGE.—Identical to gage in earlier models, but no 80 gal. removable reserve tank provision (reserve-tank capacity is 105 gals.).

(2) TANK SELECTOR VALVE.—Control handle located at left side cockpit floor and has six settings:

- (a) LEFT WING—150 (300) gals.
- (b) FUSELAGE DROP—150 (300) gals.
- (c) RIGHT WING DROP—150 (300) gals.

(d) AUXILIARY—60 gals.

(e) RESERVE—105 gals.

(f) OFF

(3) FUEL SELECTOR VALVES.—Replace Engine Selector Valve in earlier models. These valve controls, one for each engine, are installed on the lower instrument and control panel and have three settings:

(a) DOWN—OFF

(b) UP to LEFT—ON

(c) UP to RIGHT—STAND-BY

CAUTION

The fuel system is not a cross feed type, and the selector valve is installed to cut off flow to a damaged engine. Both fuel selector valves should be kept at "ON" except in cases of engine failure, when fuel flow must be cut off from the inoperative engine and that valve set at "OFF"; in case of damage to main tank both valves should be set at "STANDBY".

(4) 30 MINUTE CRUISE WARNING LIGHT.—A red jewel warning light, installed on the lower instrument and control panel, glows when fuel supply in the main tank is only sufficient for 30 minutes flight at cruising consumption.

(5) ELECTRIC BOOSTER FUEL PUMPS.—The booster pumps control switch is located on the lower instrument and control panel.

(a) Switch to LEFT—OFF.

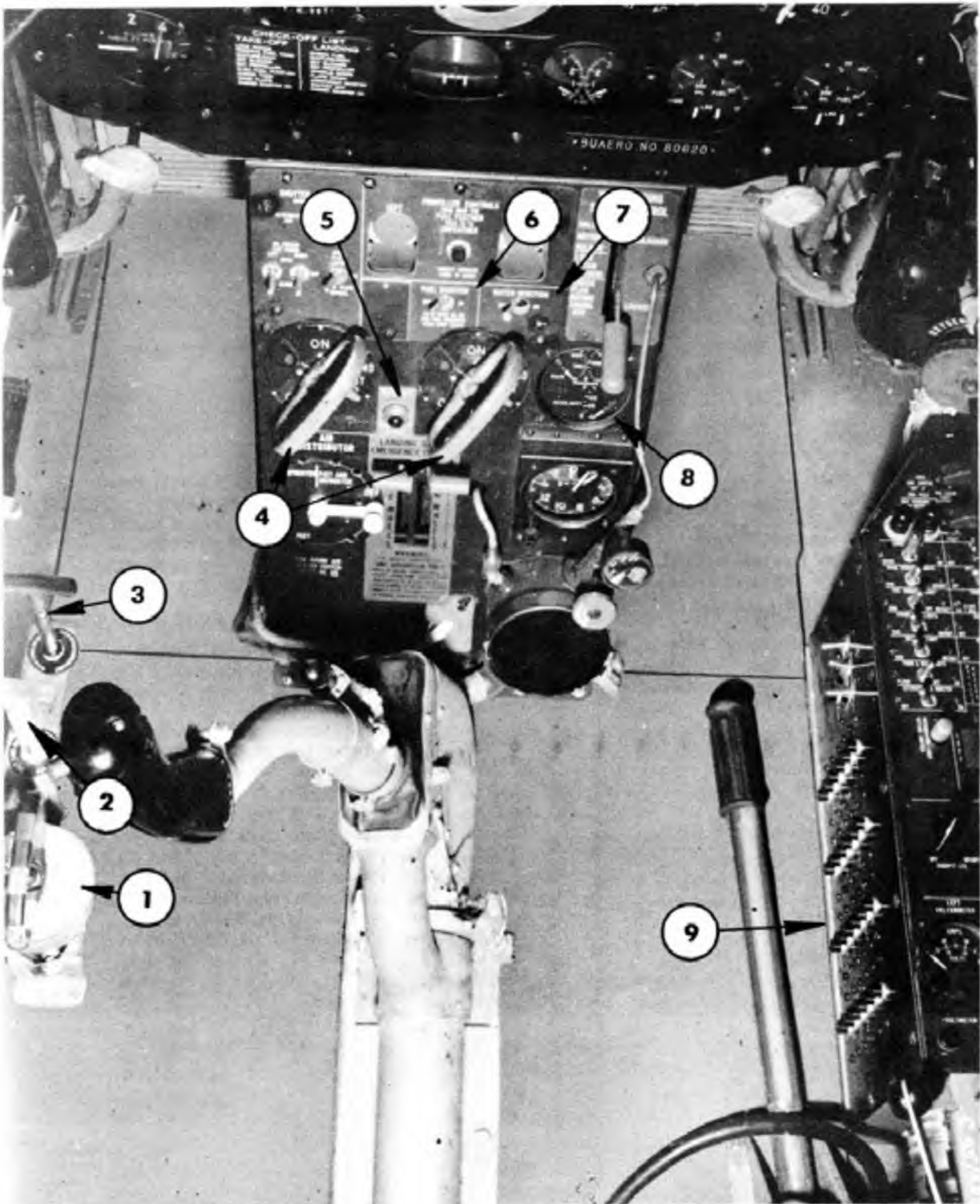
(b) Switch to RIGHT—ON.

The pumps (one for each engine) are located in the tank section and act as boosters to the engine driven pumps.

Operate the pumps to build up pressure to start the engines, maintain pressure at altitude, during critical periods of fuel system operation such as take-off, high power operation, landing or for emergency in case of failure of engine driven pumps.

(6) TANK PRESSURIZING SYSTEM.—Identical to system in earlier models.

(7) DROPPABLE TANK RELEASE CONTROLS.—Identical to controls in earlier models.



1. Fuel Tank Selector Valve Control.
2. Fuselage Bomb-Tank Manual Release Control.
3. Wing Bomb-Tank Manual Release Control (Jettison).
4. Engine Selector Valve Controls.
5. 30 Minutes Cruise Fuel Warning Light.
6. Fuel Booster Control Switch.
7. Water Injection Control Switch.
8. Fuel Quantity Indicator.
9. Circuit Breaker Panel.

Figure 14A—Fuel System Controls—Airplane Ser. No. 80608 and Subs.

KEY TO FIGURE 14B

FUEL SYSTEM DIAGRAM—AIRPLANES NO. 80608 & SUBSEQUENT

- | | |
|---|---|
| 1. Main Tank | 24. Lower Instrument and Control Panel |
| 2. Reserve Tank | 25. Fuel Transfer Warning Light |
| 3. Auxiliary Tank | 26. 30 Minute Cruising Warning Light |
| 4. 150 gal. Wing Droppable Tank | 27. Left Engine Selector Valve Control |
| 5. 300 gal. Fuselage Droppable Tank | 28. Right Engine Selector Valve Control |
| 6. 150 gal. Fuselage Droppable Tank | 29. Fuel Level Transmitter |
| 7. Tank Selector Valve | 30. Tank Filler Neck |
| 8. Fuel Selector Valve (2) | 31. Vent Line Check Relief Valve |
| 9. System Strainer with Drain Valve (2) | 32. Reserve Tank Connector Fitting |
| 10. Electric Fuel Pump (2)
(Defueling Valve on Left Pump only) | 33. Tank Pressurizing Unit |
| 11. Engine Driven Fuel Pump | 34. Tank Pressurizing Release Handle |
| 12. Carburetor Header | 35. Lines to Left Nacelle |
| 13. Check Valve | 36. Line to Right Droppable Tank |
| 14. Electric Transfer Pump | 37. Tank Pressurizing Line to Manifold Cut-off Valve
in Right Engine Nacelle |
| 15. Fuel Shut-off Float Valve | 38. Pump Drain Line |
| 16. Primer Solenoid | 39. Manifold Cut-Off Valve |
| 17. Engine Primer Distributor Unit | 40. Bomb-Droppable Tank Selector Switches |
| 18. Quick Disconnect Block | 41. Pump Vent Lines |
| 19. Deleted | 42. Wing Bomb-Tank Manual Release |
| 20. Engine Gage Units | 43. Fuselage Bomb-Tank Manual Release |
| 21. Fuel Quantity Gage | 44. Forward Face Wing Box Beam |
| 22. Primer Switch | 45. Electric Booster Pump Switch |
| 23. Tank Selector Control | |

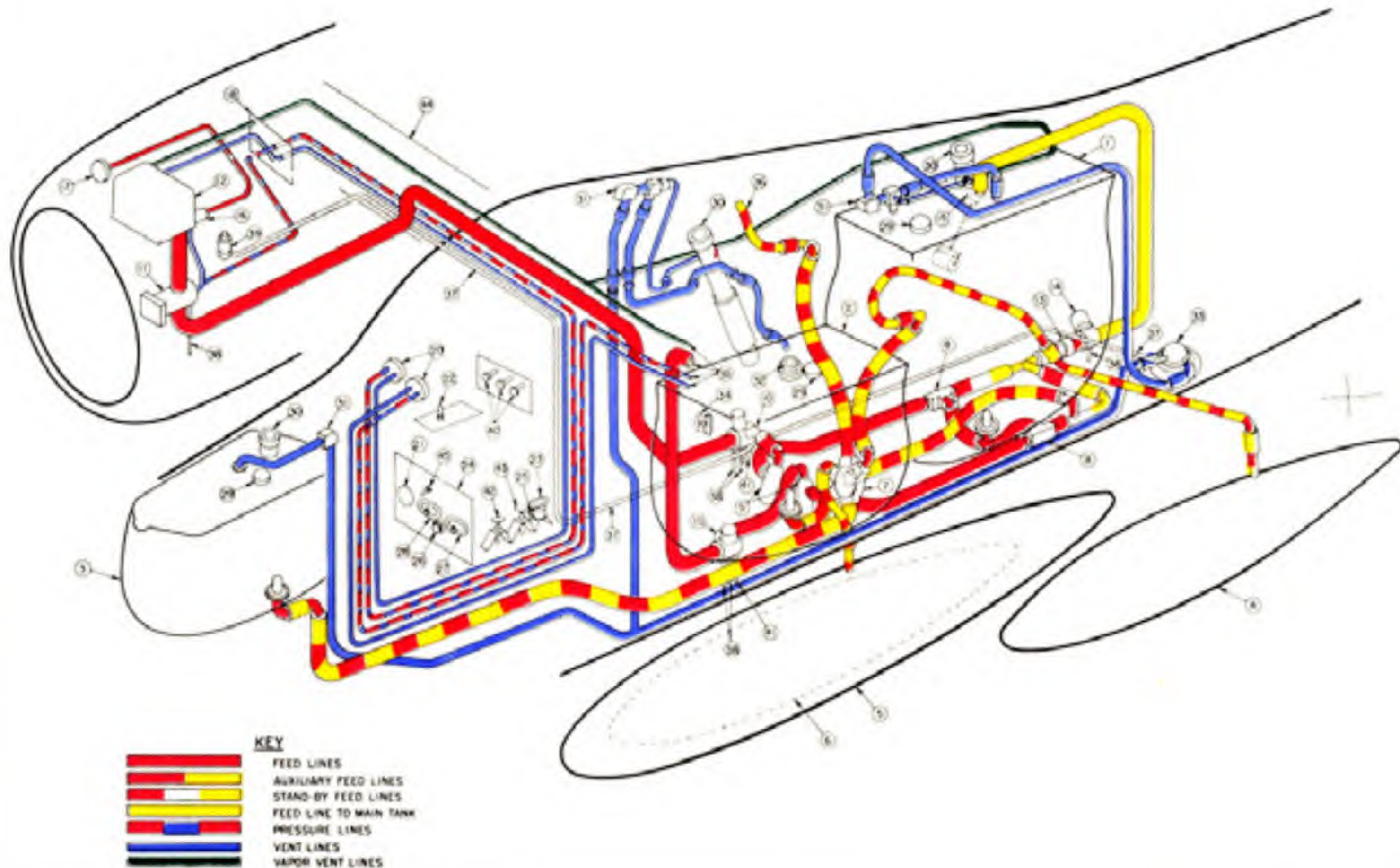
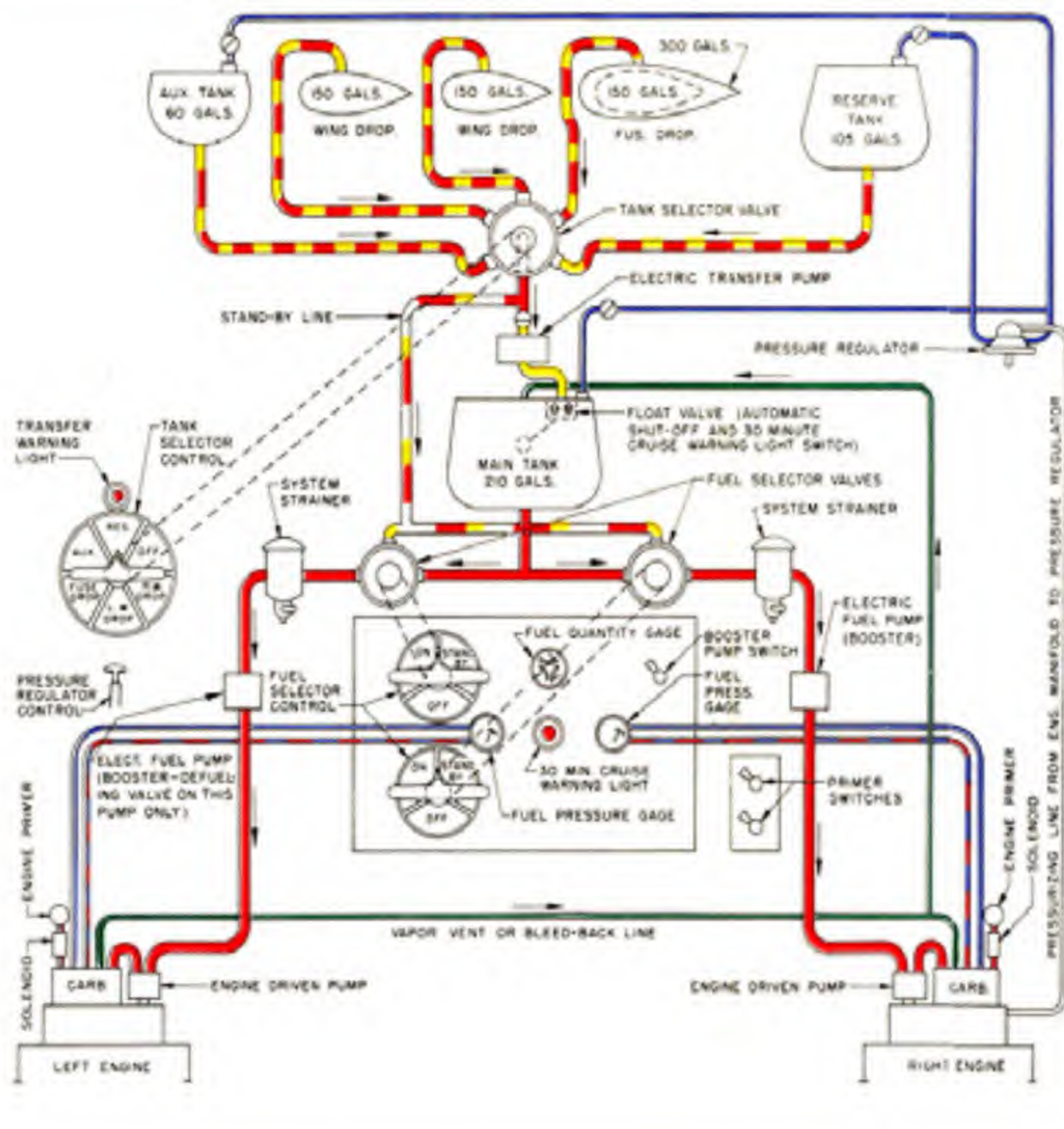


Figure 148—Fuel System Diagram—Airplanes Ser. No. 80608 and Subs.



SYSTEM OPERATION

NORMAL

(FUEL SELECTOR VALVES SET AT "ON")

FUEL FLOWS FROM SELECTED TANK THROUGH TANK SELECTOR VALVE TO TRANSFER PUMP AND INTO TOP OF MAIN TANK AND OUT OF MAIN TANK THROUGH FUEL SELECTOR VALVES, THROUGH SYSTEM STRAINERS, BOOST PUMPS, ENGINE DRIVEN PUMPS, TO CARBURETORS.

STAND-BY (BOTH FUEL SELECTOR VALVES SET AT "STAND-BY")

IF MAIN TANK IS DAMAGED, FUEL FLOWS FROM SELECTED TANK, THROUGH TANK SELECTOR VALVE, TO FUEL SELECTOR VALVES (BY-PASSING TRANSFER PUMP AND MAIN TANK) AND CONTINUES AS IN NORMAL OPERATION.

CAUTION

FOR STAND-BY OPERATION, BOTH VALVES MUST BE SET AT "STAND-BY" WATCH QUANTITY GAGE - 30 MIN. CRUISE WARNING LIGHT NOT OPERATING. TO CUT OFF ONE ENGINE, SET VALVE FOR THAT ENGINE AT "OFF". BLEED-BACK 8 TO 10 GALS. PER HOUR TO MAIN TANK - IN STAND-BY OPERATION, THIS FUEL WILL BE LOST.

TANK USE SEQUENCE

1. ANY TANK (TRANSFER - "ON")
2. RESERVE TANK ("STAND-BY")
3. WING DROPPABLE (L. OR R.)
4. WING DROPPABLE (REMAINING)
5. FUSELAGE DROPPABLE
6. BEST (RESERVE OR AUXILIARY)
7. BEST FOR LANDING

USE BOOST PUMP

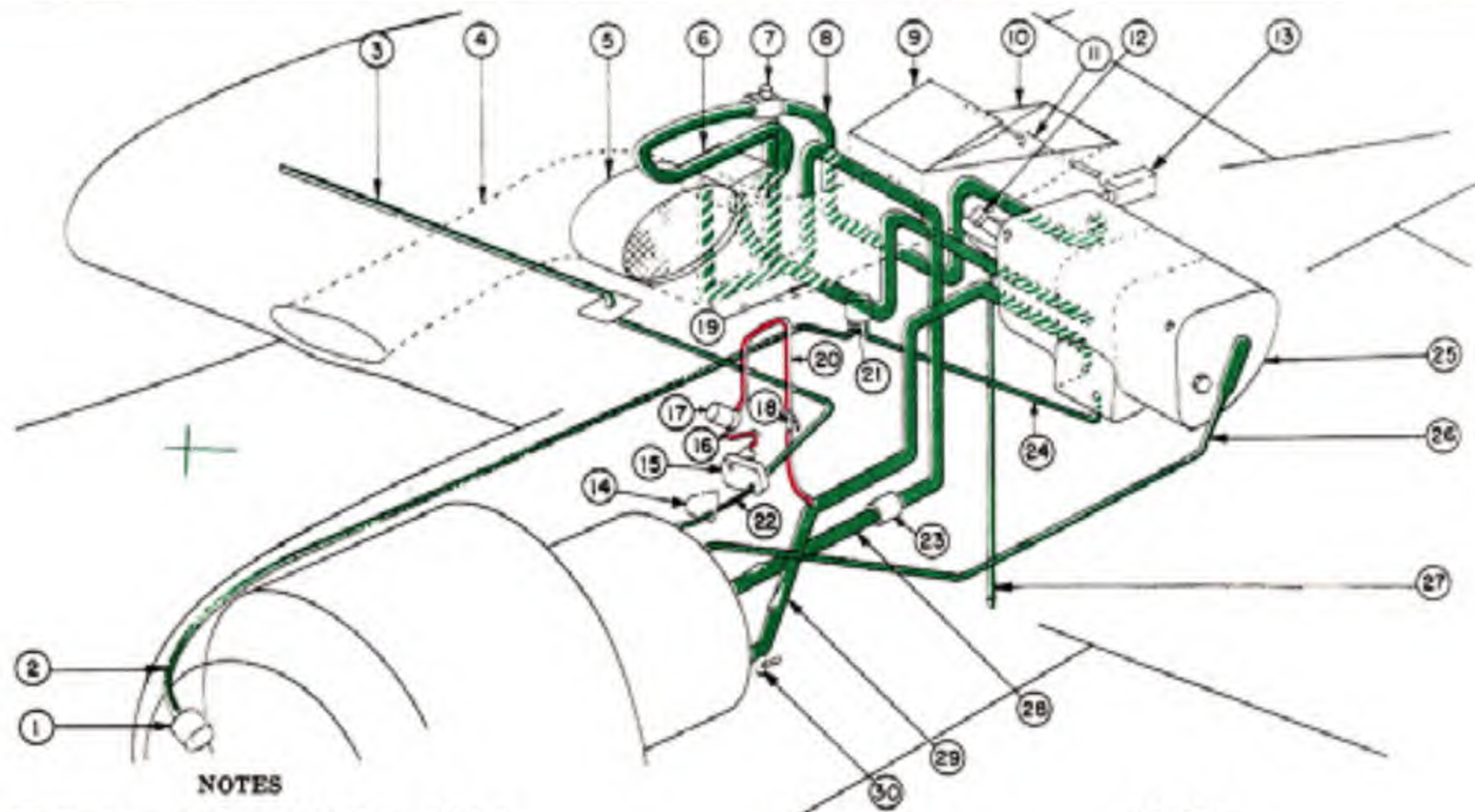
1. FOR TAKE-OFF
2. DURING CLIMB
3. WHEN SWITCHING TANKS (ON "STAND-BY" ONLY)
4. WHEN ON DROPPABLE TANKS (ON "STAND-BY" ONLY)
5. AT ALTITUDE

LEGEND

- ⊙ DESIGNATES CHECK RELIEF VALVE
- ⊗ DESIGNATES SWITCH
- ⊕ DESIGNATES CHECK VALVE

- FEED LINES
- PRESSURE LINES
- VENT LINE
- VAPOR VENT LINE
- - - STAND-BY LINE
- FEED LINE TO MAIN TANK
- AUX. FEED LINES

Figure 14C-Fuel System Control Diagram-Airplanes Ser. No. 80658 and Subs.



NOTES

1. Oil Grade — 1100 or 1120 Spec. AN-O-8. Refer to Service Instructions contained in T.O. 24-41 for further instructions with changes in operating temperatures.

2. Tank Capacities (each)—21 U.S. gals.—17.5 Imp. gals. Foaming Space—3 U.S. gals.—2.5 Imp. gals.

LEGEND

OIL FLOW LINES



OIL DILUTION (FUEL) LINES



1. Propeller Governor Unit
2. Propeller Feathering Pump to Governing Unit Line
3. Pressure Line—To Engine Gage Unit
4. Cooler Air Inlet Duct
5. Oil Cooler
6. Oil Temperature Regulator
7. Diverter Valve
8. Cooler Oil Return to Tank Line
9. Cooler Duct Door
10. Cooler Duct Exit
11. Lear Actuator

12. Fillerneck
13. Lear Motor & Automatic Temperature Control Unit
14. Instrument & Engine Lines Support Plate
15. Engine Junction Block
16. Fuel Pressure Line to Oil Dilution Solenoid Valve
17. Solenoid Valve
18. Oil Dilution Manual Shut-Off Valve
19. Cooler By-Pass Line
20. Oil Dilution Line

21. Propeller Feathering Pump
22. Flexible Oil Pressure Line—Engine Block to Plate
23. P & W Check Valve
24. Propeller Feather Line Tank to Pump
25. Tank
26. Oil Tank Vent Line
27. Scupper Drain Line
28. Oil Out Line
29. Oil In Line
30. De-Oiling Unit

Figure 15—Oilsystem Diagram

4. OIL SYSTEM.

a. OIL SPECIFICATION—AN-O-8.

b. Identical oil systems are installed in the two engine nacelles. Each system is supplied by a welded aluminum alloy tank of 21 gals., capacity with three gallons foaming space, equipped with a sump and a drain plug.

Cooling air is carried from openings in the leading edges through curved ducts across the coolers and off through openings in the upper wing surfaces. The amount of outlet opening is controlled by an electrically operated door. (See paragraph c.) The coolers are equipped with thermostatic by-pass valves.

The oil dilution system consists of a line led from the fuel pressure line to the oil-in line. The system is controlled by a solenoid operated by the switch in the pilot's cockpit and manual shut-off valves are installed to isolate the system.

c. OIL SYSTEM CONTROLS.

(1) OIL COOLER EXIT DUCT DOORS CONTROL.

(a) GENERAL. — The oil cooler exit duct doors control switches (one each engine) are located on the upper left side of the lower control panel, to the left of the cowl flaps switch.

(b) OPERATION.

1. Switch UP—OPEN.
2. Switch to CENTER—OFF.
3. Switch DOWN—CLOSED.

The oil cooler duct outlets are located in the upper wing surfaces and the doors are a part of the surface. The duct outlets are always open—the doors control the amount of opening. They are op-

erated by electric motors and screw jacks. The OFF position of the switches is used only in case of malfunctioning of the system, damage, or when the engines are stopped on the ground.

Note

To obtain intermediate settings—switch to OPEN or CLOSED, as desired, then switch to OFF position when desired door position is reached.

(2) OIL DILUTION CONTROL.

(a) A toggle switch is located on the outboard side of the pilot's switch panel to control the oil dilution solenoids.

(b) OPERATION.

1. Move switch OUTBOARD—ON (DILUTE OIL).

2. Move switch INBOARD—OFF.

When the switch is set at ON fuel flows from the fuel pressure line at the carburetor to the oil-in line. Refer to Section II for Operating Instructions.

5. FLIGHT CONTROLS.

a. AILERON AND ELEVATOR CONTROLS.—

The control stick is equipped with gun trigger and bomb release switch buttons on the grip. Dual elevator control cables are installed to reduce the possibility of elevator control being lost through single bullet impact. The right hand elevator is equipped with a spring tab, to aid control. The left hand elevator carries the adjustable trim tab. On all F7F-3 and -3N airplanes, both elevator tabs also serve as balance tabs. The ailerons are operated by a linkage of push-pull rods and idler arms actuated by a lever arm mounted on the torque tube attached to the stick. Spring tabs are installed on both ailerons, to assist control. The tab on the left aileron also serves as an adjustable trim tab.

b. RUDDER AND BRAKE CONTROL PEDALS.

(1) ADJUSTMENT.—The standard underhung pedals are adjustable to four positions. The outer pedal arms carry adjustment levers. To adjust the pedals, press the levers down, and push the pedals full forward with the toes; then put the toes under the pedals and pull aft one notch at a time until the pedals are in the desired position. Check that each pedal has ratcheted past the same number of notches.

(2) RUDDER CONTROL.—The rudder is operated by cables running from sectors attached to the pedals aft to a sector and bellcrank linked by push-pull tubes to the rudder horn. A hydraulic booster unit, consisting of an actuating cylinder and an automatically operated selector valve, actuated by movement of the rudder sector, is installed to assist the direct mechanical rudder operation; i.e., to relieve the pilot of heavy rudder pedal loads. The action of the rudder controls is positive at all times; i.e., if

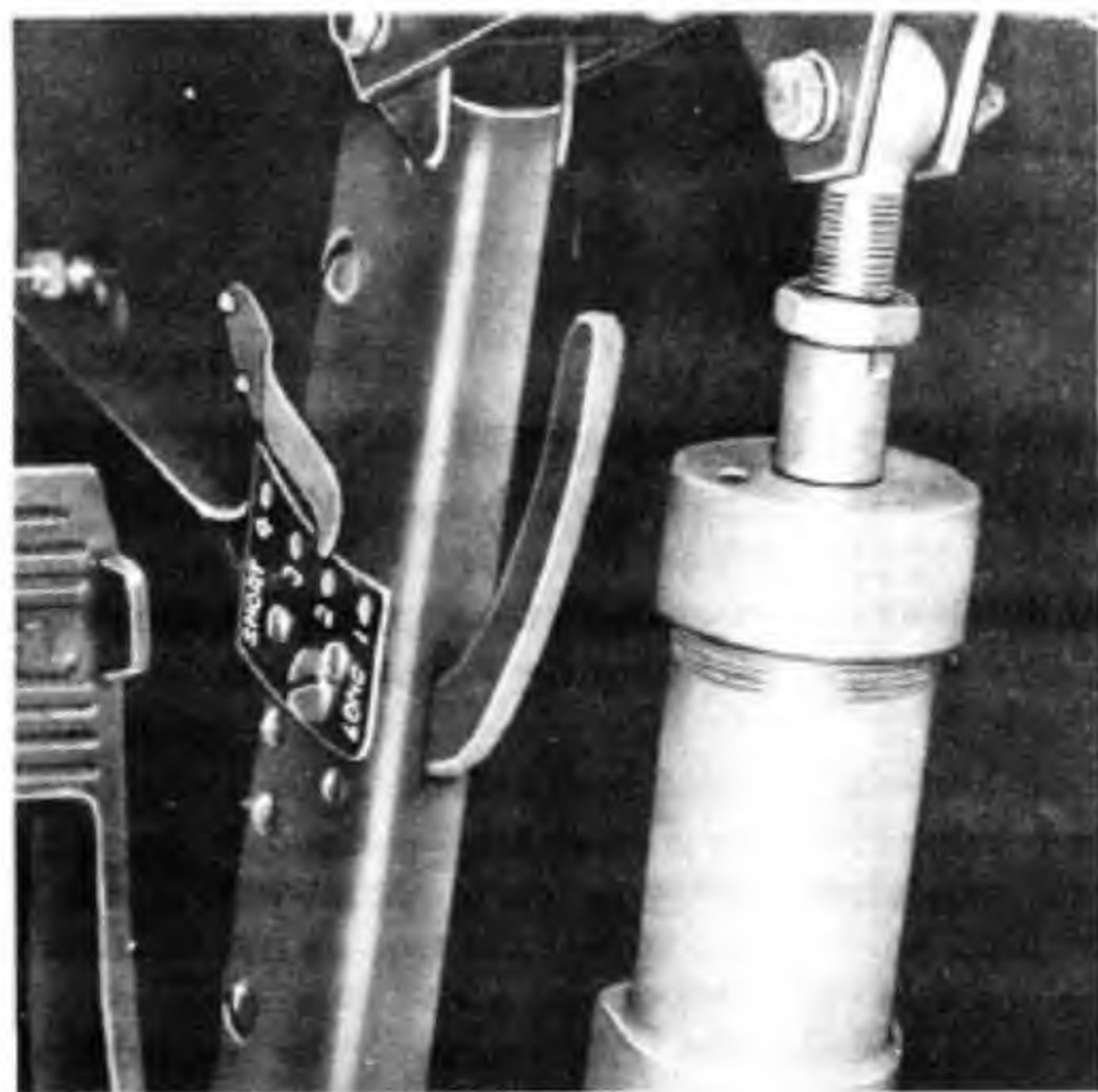


Figure 16—Pedal Adjustment Ratchet

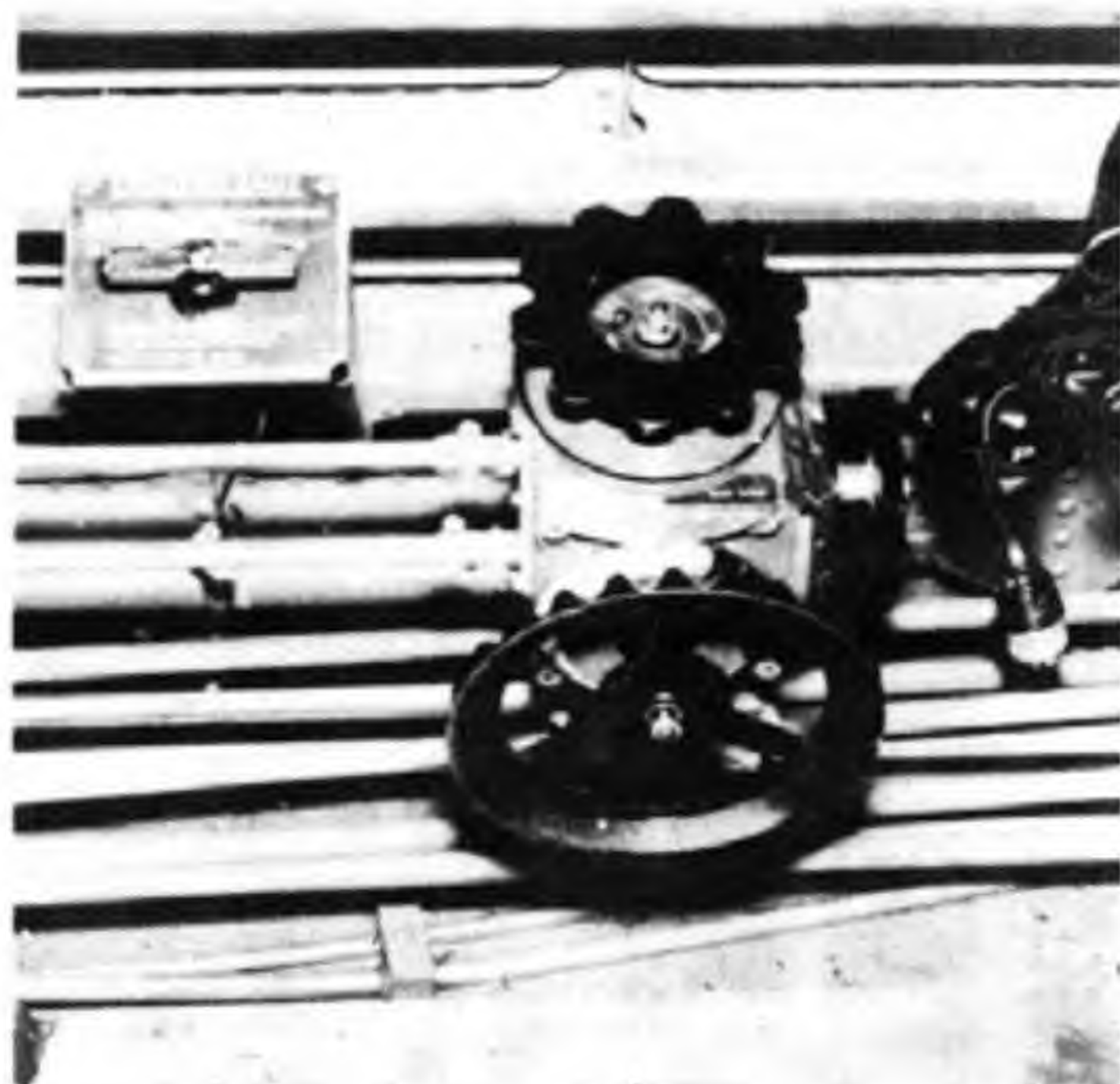


Figure 17—Tabs Controls Unit

the booster unit should fail to operate, because of hydraulic system failure, the direct cable control would continue to operate the rudder. A by-pass valve, to cut out the booster, in case of hydraulic line block, is installed in the unit, and is controlled by a lever installed on the right hand cockpit shelf, adjacent to the hydraulic hand pump control panel. The rudder tab serves both as trim and balance tab.

Note

For additional rudder and brake control information, refer to Hydraulic System Controls, paragraph 6.

c. ELEVATOR, AILERON AND RUDDER TRIM TABS CONTROLS.

(1) CONTROL UNIT.—The three tab controls are incorporated in a unit located on the left hand side of the cockpit.

Note

The black and white neutral position index on the inboard side of the box is for the elevator tab only. The red and green neutral position index on the forward side of the box serves for both the aileron and rudder tabs.

The operation of the controls is standard.

(a) Elevator Tab Control (wheel on inboard side of unit). Rotate forward—nose down.

(b) Rudder Tab Control (knob on top of unit). Rotate clockwise—nose right.

(c) Aileron Tab Control (knob on forward end of unit). Rotate right side down—right wing down.

The tab installed on the left aileron serves both as a trim and an automatic spring control tab.

The two controls function independently and do not affect each other.

6. HYDRAULIC SYSTEM CONTROLS.

a. GENERAL.—Pressure for the hydraulic system, operating the extension and retraction of the landing gear, arresting hook, wing flaps, wing folding, gun charging, rudder booster and brake action, is normally supplied by two engine-driven pumps. A hand pump system is installed for auxiliary operation, when the engine-driven pumps are not operating. An engine-driven pump is installed on each engine and the fluid reservoir (4.22 U.S. gals., 3.51 Imp. gals. capacity), strainer and drain, system accumulator, unloader valve and system relief valve are located in the right engine nacelle, on the inboard side. Pressure and return lines run from the nacelle to the hydraulic controls (selector valves) and to the hand pump and hand pump selector valve panel, in the cockpit, and out to the various actuating cylinders. The normal hydraulic system operating pressure is 1500 psi. The normal pump pressure is zero, until some circuit is operating when pump pressure becomes 1500 psi. The system pressure gage is located on the hand pump selector valve panel on the right hand side of the cockpit. Hydraulic fluid specification AN-VV-0-366 (red color).

Note

1.

When the hand pump selector valve control is set at "SYSTEM" and the engine driven pumps are operating, if the pressure gage indicator falls below approx. 1250 psi, malfunctioning of the pumps is indicated. Any circuit may be checked for malfunctioning by observing the gage while moving the selector valve control from one setting to another. When this control is not being used for operating one of the units, keep it at SYSTEM.

2.

In the event of hydraulic system failure, due to a leak or break in a line or unit, the location of the leak can be determined by using the hand pump to test the various systems. After setting the selector valve, approximately 8 to 10 double strokes of the hand pump should be sufficient to determine if pressure can be built up in the selected system. After locating the leak, do not use the damaged system, if possible, so as to retain the hydraulic pressure for operation of other systems.

b. EMERGENCY CONTROL FOR LANDING GEAR EXTENSION AND BRAKE SYSTEM.—Air bottles (one for nose wheel, one for main wheels and one for the brake system) are installed in the nose section of the fuselage. For information concerning emergency operation, refer to Section IV.

c. LANDING GEAR CONTROL.

(1) GENERAL.—The main and nose wheels are



Figure 18—Landing Gear Control

raised and lowered by operating a lever with a square knob handle, located on the left side of the cockpit outboard of the left rudder pedal and below the ignition switch.

To lower the wheels—move lever DOWN.

To raise the wheels—move lever UP.

To prevent inadvertent retraction of the wheels when the airplane is on the ground, an automatic lock, to stop movement of the control lever, is installed. It is operated by the torque scissors on the left main wheel through a flexible control shaft. When the weight of the airplane is on the wheels, the scissors is partially closed and in such a position that the lock is set in place. When the airplane leaves the ground, the wheels drop down to open the scissors, pull down the control shaft, and disengage the lock.

CAUTION

When making sharp left hand turns, or taxiing over rough ground, the control lock may not be effective.

For emergency (hand pump or air bottle) operation of landing gear, refer to Section IV.

(2) **LANDING GEAR POSITION INDICATOR.**—A standard landing gear and flaps position indicator is located on the right side of the main instrument panel. The position of each main wheel and the nose wheel is shown separately; also whether the wheels are down and locked. The indicator is operated by micro-switches installed on each landing gear assembly. In case of landing gear indicator malfunctioning, the main wheels can be observed for locked position and the nose wheel can be felt locking by a thump as it reaches full extension. A section of the left engine cowl is buffed clear of paint to serve as a

mirror in which the nose wheel position can be observed.

d. **ARRESTING HOOK CONTROL.**—The arresting hook is operated by a two-way control lever located on the right hand side of the cockpit forward of the hydraulic control panel. When the lever is moved aft, the hook lock is released and the hook drops down. When the lever is moved forward, the cylinder piston retracts to draw the hook up, and the lock snaps into the locked position. The approach light is turned on when the hook is lowered.

(1) To lower (extend) hook for carrier landings—move lever full aft.

(2) To raise (retract) hook—move lever full forward.

CAUTION

The pilot shall insure that the lever is in the **HOOK LOWERED POSITION** prior to landing aboard a carrier.

e. **BRAKE CONTROL.**—The brake control system, two power brake control valves mounted on the pedals, a separate brake system accumulator and lines to the disc type brakes, is a branch of the airplane hydraulic system; toe pressure on the upper sections of the rudder pedals applies the brakes.

In the event that the hydraulic system is shot up or otherwise damaged it is still possible that the brake system may operate approx. 12 times because of the fluid and pre-load of air in the accumulator. To ascertain whether or not the brake system is in operating condition before landing, deflect the brake pedals **ONCE**—if normal pressure is required it indicates that the system will function for a normal landing and a reasonable amount of taxiing.



Figure 19—Arresting Hook Control

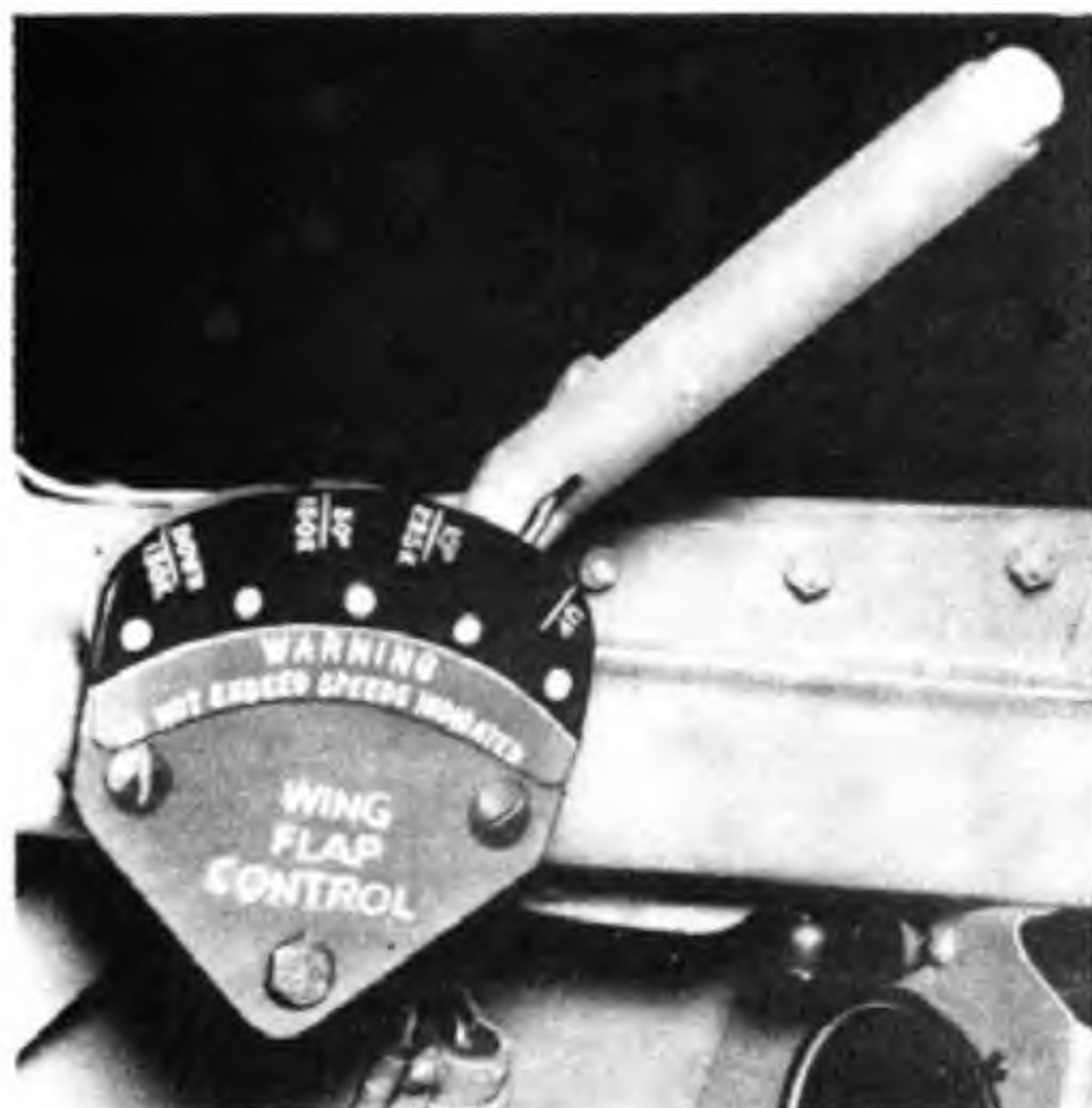


Figure 20—Wing Flaps Control

Since the fluid and air load of the accumulator will be reduced each time brake pressure is applied and then relieved, test the pedals only ONCE and endeavor to make a smooth controlled stop after landing to allow for a reasonable amount of taxiing.

For emergency (hand pump or air bottle) operation of brake system, refer to Section IV.

f. WING FLAPS CONTROL.

(1) GENERAL.—The flaps control lever is installed on a quadrant on the left side of the cockpit, forward of and above the engine control quadrant. There are four settings on the quadrant—forward setting for FLAPS UP, and aft to 15°, 30°, and 40° (MAX. FLAPS DOWN). The settings are marked adjacent to the four notches on the quadrant.

(2) OPERATION.—Press button on handle and move lever as follows:

(a) FLAPS UP.

Lever in FULL FORWARD POSITION.

(b) FLAPS DOWN.

KEY TO FIGURE 21 HYDRAULIC SYSTEM DIAGRAM

- | | |
|---|--|
| 1. Engine Driven Pump (R.H.) | 25. Hand Pump Selector Valve |
| 1A Engine Driven Pump (L.H.) | 26. Arresting Hook Selector Valve |
| 2. Timer Check Valve— | 27. System Pressure Gage |
| Main Wheels Down Line (2) | 28. Hand Pump |
| 3. Shuttle Valve (2) | 29. Hand Pump Pressure Line Filter |
| 4. Unloader Valve | 30. Pressure and Thermal Relief Manifold |
| 5. Vent Line Filter | 31. Power Brake Valve (2) |
| 6. Reservoir | 32. Gun and Cannon Charging Valve (4) |
| 7. System Accumulator | 33. Landing Gear Selector Valve |
| 8. System Relief Valve | 34. Brake Air Bottle Pressure Gage |
| 9. System Filter | 35. Air Vent Valve |
| 10. Nacelle Door Actuating Cylinder (2) | 36. Landing Gear Dump Valve |
| 11. Main Wheel Actuating Cylinder (2) | 37. Landing Gear Air Bottle Dump Valve (2) |
| 12. Timer Check Valve (2) | 38. Main Wheels Emergency Air Bottle |
| 13. Wing Locking Cylinder (4) | 39. Nose Wheel Emergency Air Bottle |
| 14. Timer Check Valve (4) | 40. Main Wheels Emergency Air Bottle Gage |
| 15. Wing Folding Cylinder (4) | 41. Nose Wheel Emergency Air Bottle Gage |
| 16. Shuttle Valve | 42. Nose Wheel Actuating Cylinder |
| 17. Strainer (4) | 43. Shuttle Valve—Nose Wheel |
| 18. Timer Check Valve— | 44. Brake Emergency Air Bottle |
| Nacelle Door Open Line (2) | 45. Hydraulic Brake System Accumulator |
| 19. Shuttle Valve—Main Wheels (2) | 46. Gun and Cannon Thermal Relief Manifold |
| 20. Wing Flap Actuating Cylinder (4) | 47. Fuselage Guns Charging Cylinder (4) |
| 21. Restrictors (8) | 48. Arresting Hook Actuating Cylinder |
| 22. Cannon Charging Cylinder (4) | 49. Rudder Booster By-Pass Valve |
| 23. Wing Flaps Selector Valve | 50. Rudder Booster Actuating Cylinder |
| 24. Wing Folding Selector Valve | 51. Rudder Booster Selector Valve |

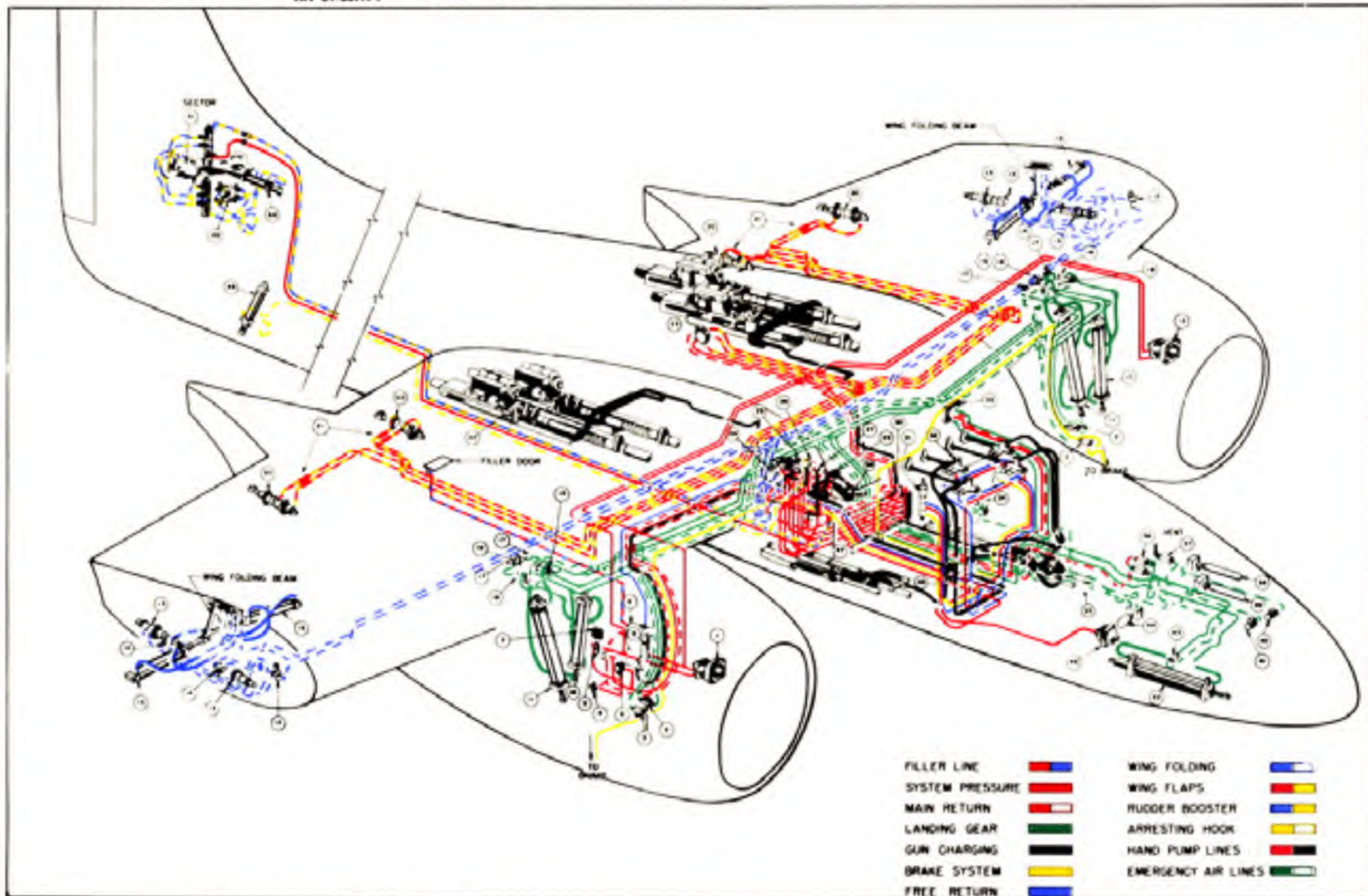


Figure 21-Hydraulic System Diagram



Figure 22—Wing Folding Control

- 15°—Lever in FIRST NOTCH AFT.
- 30°—Lever in SECOND NOTCH AFT.
- 40°—(Max. DOWN)—Lever is FULL AFT.

WARNING

For flaps UP, return lever to FULL FORWARD position.

(3) FLAPS POSITION INDICATOR. — The standard electrical landing gear and flaps position indicator is located on the right side of the main instrument panel.

CAUTION

When operating control, check position of flaps on indicator. On a new or overhauled airplane, operate flaps several times before take-off, as dirt may lodge in the lines or restrictors, (installed to insure simultaneous action) and may cause uneven flap action.

g. WING FOLDING CONTROLS.

(1) GENERAL.—The wings are folded vertically and spread, and locked in the spread position, by the action of the hydraulic wing folding (2L-2R) and locking (2L-2R) cylinders. A mechanical safety lock is installed to lock the hydraulically operated lockpins in place after the wings are spread. Jury struts are provided to hold the wings in place in the folded position. The folding control is a standard hydraulic selector valve control lever located on the hydraulic control panel to the right of the seat.

(2) TO SPREAD THE OUTER WING PANELS.

(a) Check that the wing jury struts are removed.

(b) Move the wing folding control handle outboard—TO SPREAD.

(c) When fully spread, push DOWN and LOCK the handle located at the upper right side of the lower instrument and control panel—to lock the wing lockpins in the spread position.

(3) TO FOLD THE OUTER WING PANELS.

(a) Pull UP the handle to UNLOCK the safety locks.

(b) Move the wing folding control handle inboard—TO FOLD.

(c) Set wing jury struts in place (the struts hook into fittings at inner panel Station #103 and outer panel Station #243 and are adjustable for length.)

(4) Lock Position Indicators, red painted flags, operated by the mechanical lock through bellcrank and pushrod linkages, are installed in the inner panels, at the folding axis. When the handle is pulled up, the indicators are raised above the wing surface; when the handle is pushed down, the indicators disappear into the wings to show that the wings are locked in spread position.

(5) A warning horn, or howler, is installed on the aft side of the headrest and is operated by micro-switches installed at the folding axis. When the wings are spread the horn sounds as the outer panels leave the folded position and continues to sound until the handle is pushed down, to lock the lockpins in place. When the wings are folded, the horn sounds as the handle is pulled to unlock the lockpins and continues to sound until the outer panel reaches the full folded position.

Note

The horn will also sound when the wheels are lowered if the Master Armament Switch is set to "ON".



Figure 23—Wing Fold Safety Lock Control

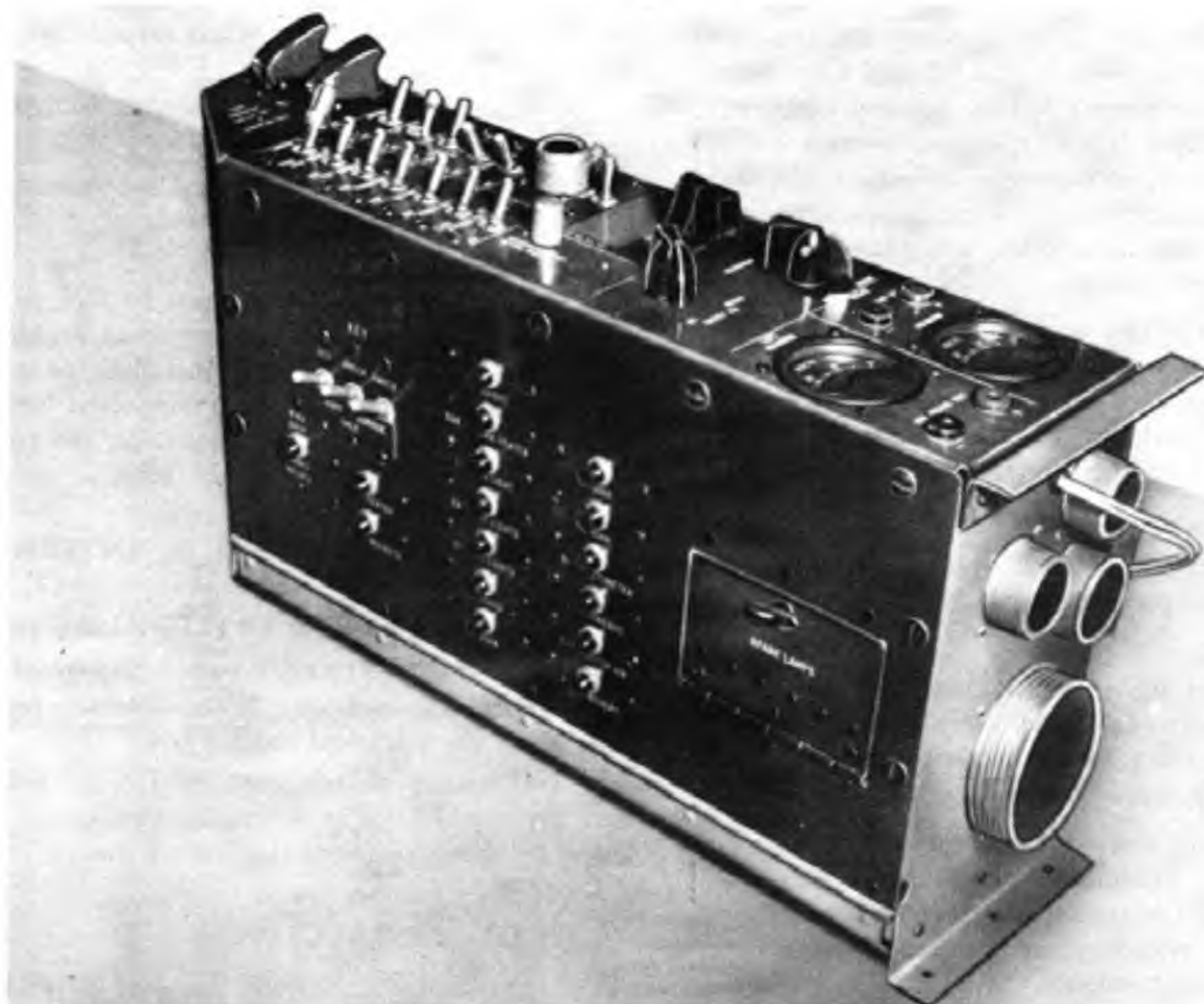


Figure 24—Pilot's Switch Box

If it is difficult to operate the handle, to lock or unlock the pins, in the folding or spreading operation, operate the hand pump system for several strokes, to move the lockpins fully into place—the pins must be fully extended or retracted before the "lock-lock" can be operated.

For emergency operation of wing folding control, refer to Section IV.

b. RUDDER BOOSTER BY-PASS CONTROL.—For information concerning operation of rudder booster by-pass control, refer to Section IV.

i. GUN CHARGING CONTROLS.—For information concerning operation of gun charging controls, refer to Section V.

7. ELECTRICAL SYSTEM CONTROLS.

a. Power for the 28 volt electrical system is provided by two generators, one on each engine. The system includes two cut-out relays, one for each generator. When the generators are not operating, power is supplied by a 24 volt battery installed in the aft end of the right hand nacelle.

b. In addition to the engine ignition, the following units are electrically operated: lights, propeller feathering controls, instruments, cowl flaps, water injection system, fuel transfer system, gun camera, oil cooler doors, gun heaters, carburetor air doors, cockpit heat-

er, engine priming, oil dilution, starter, warning howler, fuel booster pump, radio and radar, gun and bomb release solenoids, wing drop tank selector and bomb-rocket selector.

c. The main junction box is located in the fuselage aft of the pilot's cockpit, and junction boxes are located at distribution points in various sections of the airplane.

d. The following controls are located on the distribution panel and switch box on the right hand side of the pilot's cockpit; directions for their operation are given on adjacent nameplates:

(1) Landing, wing running, tail running, formation, section, formation and section, exterior lights master, recognition and recognition keying lights switches.

CAUTION

Do not lower the landing light at speeds above 120 knots. Check position of light during engine warm-up.

(2) Instrument panel and cockpit lights rheostats.

(3) Generator (right and left), battery, pitot heater, cabin heater, oil dilution, radio master, engine primer, and engine starter (with safety cap) control switches.

(4) Circuit breaker re-set buttons for the following circuits are installed on the inboard side of the box: gunsight, gun camera heater, landing light, exterior lights, cockpit lights, compass, heater, radio, radar, radio altimeter, instruments, carburetor air, and radar, radio altimeter, instruments, carburetor air, panel receptacle, automatic pilot, wing bomb arming and wing drop tank selector.

e. A panel receptacle, for the attachment of electrically operated pilot equipment is installed in the center of the panel. Two voltmeters, one for each engine, equipped with jacks for attaching test equipment, are installed on the aft end of the panel.

CAUTION

A voltage range of 27.5—28.5 should show on the meters for proper operation of electrical equipment.

f. The gunsight light rheostat and toggle switch (with two settings—ON and ON—ALTERNATE) are located below the pilot's left cockpit rail, forward, adjacent to the ignition switch.

g. The following electrical controls are located on the pilot's lower instrument panel: oil cooler exit doors, cowl flaps, carburetor air, fuel booster pump, water injection system, and propeller feathering switches and circuit breaker.

h. Red jewel fuel warning lights are located on the lower instrument and control panel and on the tank selector control.

i. Micro-switches, operating the landing gear and flaps position indicator are installed in the nacelles and fuselage. Micro-switches for the wing folding warning howler are installed at the folding axes.

j. The cockpit, instrument panel and gunsight light

rheostats shut off the lights when turned full counter-clockwise.

A separate cockpit lights rheostat is installed in the radar operator's cockpit.

k. Spare instrument panel bulbs are stowed in containers on the upper left hand side of the main instrument panels in both cockpits.

l. The radio master switch must be ON to operate any of the radio equipment. A two-way toggle switch equipped with a safety cap, is installed for use when an external AC power source is connected for ground testing radar—the switch is located on the right side of the pilot's cockpit above the electric switch box and control panel.

Move switch FORWARD for INTERNAL AC power.

Move switch AFT for EXTERNAL AC power.

m. THE IFF DESTRUCT switch, equipped with a safety cap is just outboard of the arresting hook control, aft of the electrical control box.

n. The battery switch must be ON to prime and start the engines. The following circuits are not affected by the position of the battery switch.

- (1) Recognition lights.
- (2) IFF "DESTRUCTOR".

Note

If any of the electrical equipment fails to operate, push the circuit breaker re-set button for the defective circuit.

o. The following armament switches are located on the upper left hand corner of the main instrument panel: armament master, wing bomb safetying and arming, guns selector, bomb and tank release, bomb and tank or rocket selector and rocket arming nose-tail.



Figure 25—Radar Operator's Cockpit Hood



Figure 26—Pilot's Cockpit Hood

8. MISCELLANEOUS CONTROLS AND EQUIPMENT.

a. COCKPIT HOODS.

(1) PILOT'S COCKPIT.—The cockpit hood consists of a fixed forward section, a sliding middle section, and the aft section, formed by the headrest bulkhead and headrest fairing. The sliding section is moved forward and aft by a handcrank, operating a chain and sprocket assembly, located on the forward right hand side of the cockpit.

(a) OPERATION.—The hood may be set at any desired position from full open to closed by rotating the handcrank.

Models F7F-1N and -2N.—The hood may be locked in any position by allowing the spring loaded detent to engage in one of a series of holes drilled in the back plate. (Lock lever in outboard position.)

Models F7F-3 and Subs.—An improved type handcrank moves the hood to the desired position. The handle of crank is equipped with a friction device which locks the hood in the desired position. The friction device is engaged when the "T" handle (formerly the lock handle) is in the outboard position.

1. To CLOSE the hood, ROTATE THE HANDCRANK COUNTERCLOCKWISE.

2. To OPEN the hood, ROTATE THE HANDCRANK CLOCKWISE.

(b) LOCK (F7F-1N AND -2N ONLY).—A yellow lock lever is installed below the crank. To LOCK the hood in position from inside PUSH YELLOW LEVER OUTBOARD. To UNLOCK, PULL YELLOW LEVER INBOARD.

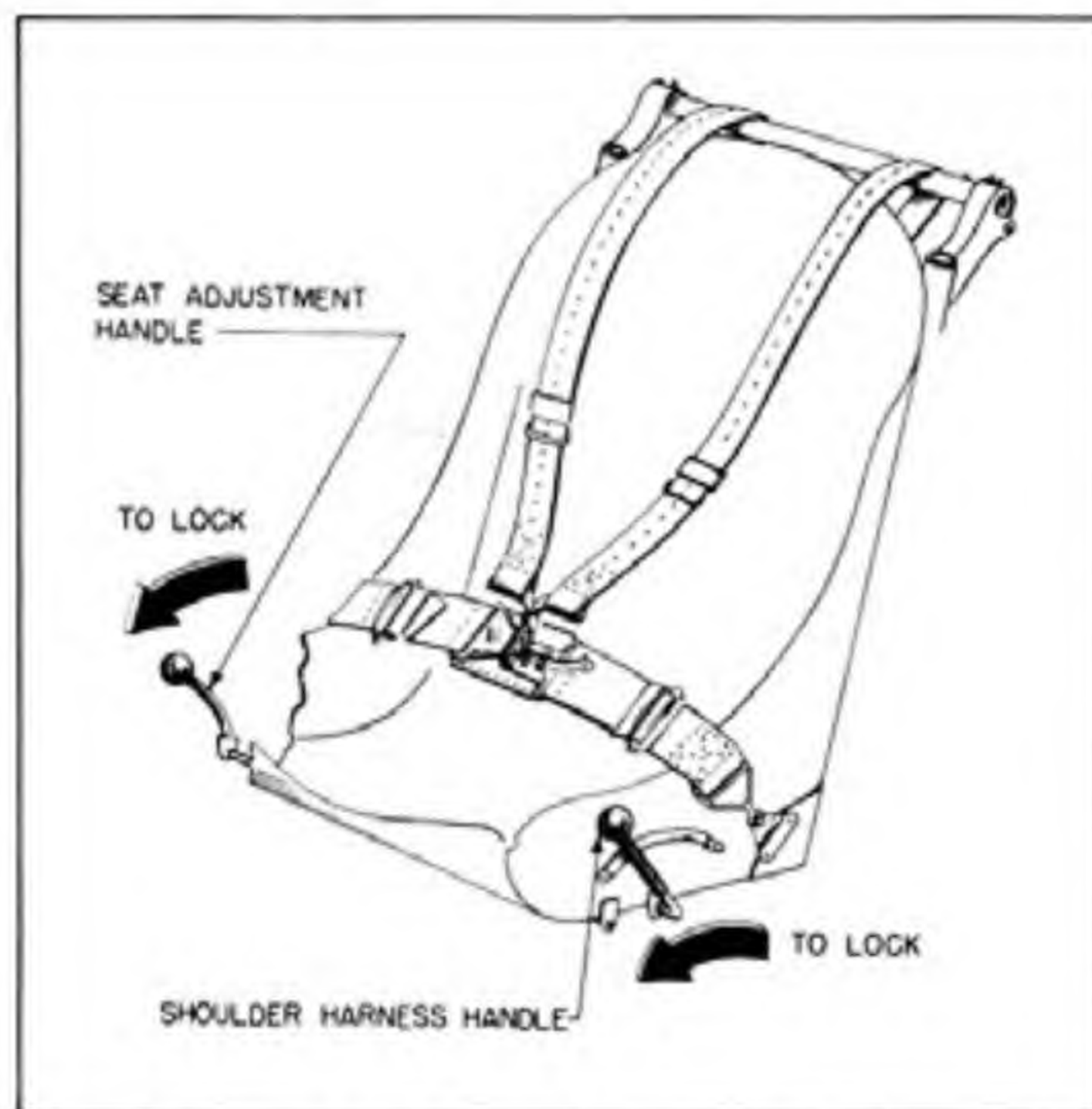


Figure 28—Pilot's Seat and Harness

Note

On F7F-1N and -2N airplanes, Serial No. 80259-80358 inclusive a red release button on fuselage skin unlocks the hood from outside. On airplanes Serial No. 80359 and subsequent the outside release button is removed. The hood is not locked and may be pulled open.

(2) RADAR OPERATOR'S COCKPIT. — The radar operator's hood, hinged on the left cockpit rail and opening on the right consists of a single molded plexiglas panel.

To open hood, lift finger latch on right side and raise hood to OPEN.

To lock hood closed, push red handle on right side full forward.

b. PILOT'S SEAT AND HARNESS.—The standard pilot's seat may be adjusted vertically to any one of four positions (total adjustment three inches). The adjustment lever is located on the right hand side of the seat. The adjusting mechanism is spring loaded; to adjust the seat position, pull the lever up, JOGGLE the seat to the height desired, and release lever to lock seat in position. The pilot's weight will bring the seat down to a lower position when the lever is pulled up to unlock. To operate properly, the standard type shoulder harness must be passed over the horizontal tube at the back of the seat and then fastened to the safety belt. To obtain freedom of movement enabling the pilot to lean forward push downward and pull back lever on the left side of the seat. MAKE CERTAIN THAT THE LEVER IS RETURNED TO THE FORWARD (LOCKED) POSITION FOR TAKE-OFF AND LANDING.

Figure 27—Pilot's Heater and Defroster Control
Revised 1 July 1949

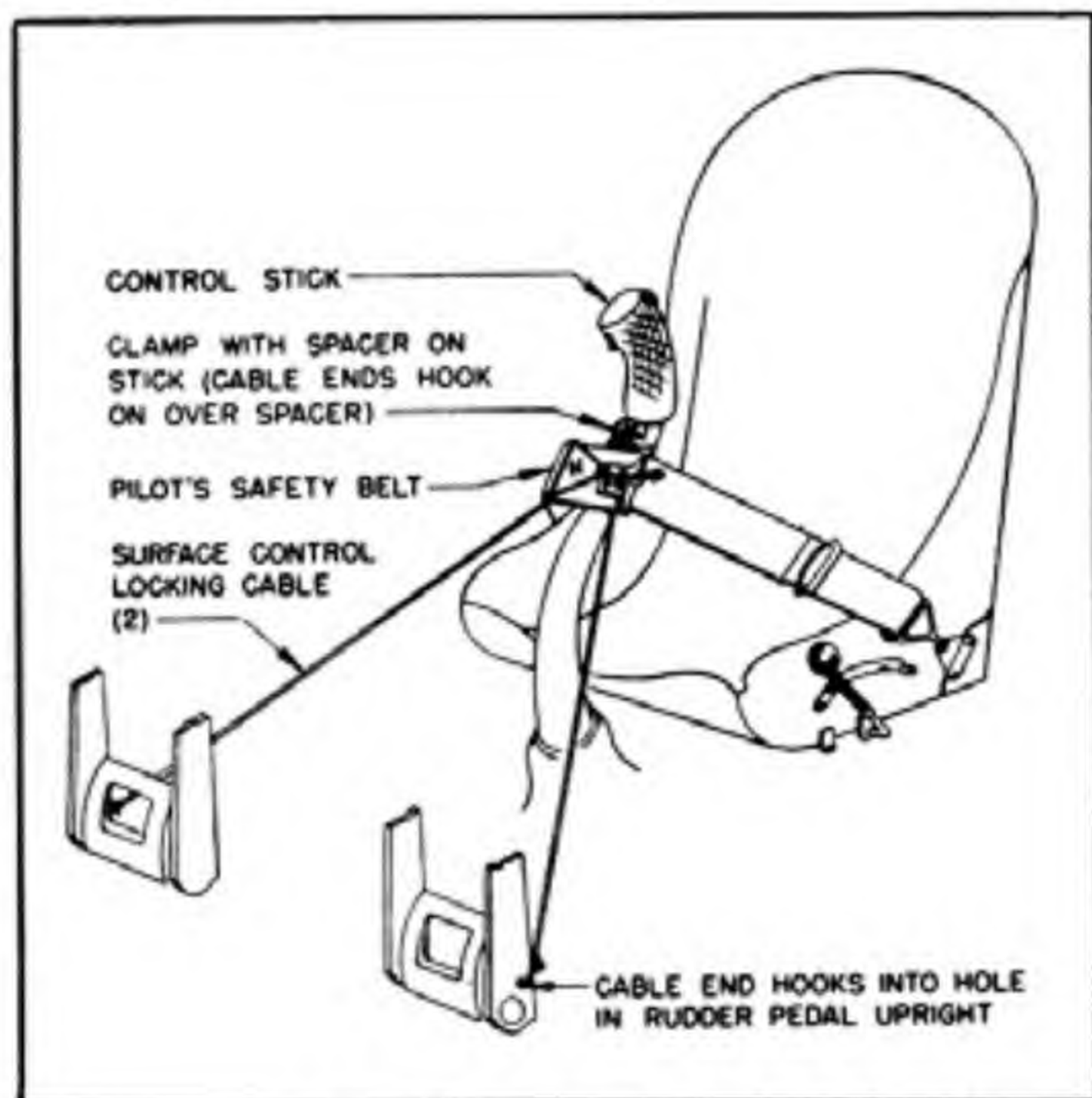


Figure 29—Controls Lock

c. EQUIPMENT CONTROLS.

(1) COCKPIT HEATER AND DEFROSTER.—

The cockpit heater control switch is located on the outboard side of the electric distribution panel; the selector lever for the pilot's cockpit is located on the lower part of the lower control panel.

- (a) Move switch **OUTBOARD—ON.**
INBOARD—OFF.

(b) Set control lever (pilot's) at desired position.

1. UP to LEFT—WINDSHIELD DEFROSTER.
2. UP to RIGHT — WINDSHIELD DEFROSTER and OUTLET AT FEET. (Two settings).
3. DOWN — OUTLET AT FEET ONLY. (Two settings).
4. To RIGHT—OFF.

Note

Pilot's control switch and lever must be ON for heat to the radar operator's cockpit.

The standard hot air combustion type heater operates on fuel drawn from the fuel pressure gage line. The toggle switch controls the metering valve and ignitor, and the control lever controls valves in the distribution ducts. A spring loaded safety switch is controlled automatically by setting the lever—when lever is set at OFF the heater circuit is broken. A heater circuit breaker re-set button is located on the side of the electric distribution panel and a switch operated by the landing gear is installed in the circuit—the heater is automatically shut off when the gear is extended.

The heater controls may be used for cold air by setting the control switch at OFF and setting the lever as desired.

WARNING

Do not operate heater during take-off, landing, full power operation or armed combat.

d. CONTROLS LOCK.—The controls lock or parking harness, supplied with the airplane, consists of two steel cables equipped with hooks at the ends, a clamp, equipped with a bolt and spacer assembly, installed on the control stick below the grip, and the pilot's safety belt. To lock the controls, hook each cable to a rudder pedal arm and the spacer on the clamp and draw the safety belt tight over the stick above cables until the cables are taut, and lock belt.

e. CHARTBOARDS.—The pilot's chartboard is supported on rails located forward of the main instrument panel. The radar operator's chartboard is stowed below his instrument panel. To use, rotate the securing clip to free the board, and pull out (board slides out on rails). The clip must be set in position to lock the board in place when landing or taking off.

f. MAP CASES.—The pilot's case is installed on the left side of the cockpit below the rail, adjacent to the seat. The radar operator's case is installed on the right side, forward.

g. RELIEF TUBES.—The relief tubes are stowed in clips beneath the seats.

h. ANTI-BLACKOUT PROVISIONS.—An automatic control valve is mounted on a bracket on the cockpit floor at the left forward corner of the pilot's seat. Three lines run to this valve; one vents to the atmosphere, one to a quick disconnect (mounted on pilot's seat) and the third connects with the left hand engine vacuum system at the oil separator.

When the pilot's personal equipment is attached to the quick disconnect the operation of the system is entirely automatic. For more detailed information refer to applicable Service Publications.

i. AUTOMATIC PILOT, TYPE GR-1.

(1) GENERAL.

(a) On the later model F7F-3N airplanes, a type GR-1 automatic pilot is installed. It is a pneumatic-hydraulic-electric pilot of a self-synchronous, maneuvering type. The pilot is used to automatically operate the airplane controls in order to maintain a predetermined attitude with respect to the longitudinal, lateral and vertical axes, and to enable maneuvering of the aircraft through automatic control.

(b) Synchronization is a continuous automatic adjustment relative to the position of the airplane assuring continuation of the airplane's flight attitude at the moment of engagement of the automatic pilot.

(c) While on automatic flight, maneuvers may be executed by simple finger-tip operation of a small control lever located in the cockpit. The limits of all maneuvers are controlled by the operating limits of the automatic pilot which are: dive, 50 degrees; climb, 30

degrees; and bank, 45 degrees.

(d) There are only two controls for flying with the automatic pilot: an on-off control handle, and a controller.

(2) ON-OFF CONTROL HANDLE.—The automatic pilot is engaged and disengaged by the on-off control handle which is located on the left-hand side of the cockpit just forward of the wing flap control lever. The handle, of the push-pull type, has three positions.

(a) Full-in—"OFF".

(b) Middle—"ON".

(c) Full-out—"CENTRALIZED".

Note

The "CENTRALIZED" position automatically returns the airplane to a straight and level attitude. In this position, the handle must be held manually until straight and level flight or any desired intermediate recovery is attained. When released the handle returns to the "ON" position.

(3) CONTROLLER.

(a) The automatic pilot controller is located on the right-hand shelf in the cockpit. By proper manipulation of the controller, the operator can maintain straight and level flight, or can change the attitude of the airplane. Dives, climbs, banks, co-ordinated turns, and climbing and diving turns can be achieved by simple finger-tip operation of the lever. A button, which is mounted on the lever, is depressed when it is desired to maintain a set course. See Section II for operating instructions.

(b) The limits of maneuvers are governed by the operating limits of the automatic pilot which are as follows:

1. Dive—50 degrees.
2. Climb—30 degrees.
3. Bank—45 degrees.

Note

For information on Oxygen, Armament and Radio Equipment Controls, refer to Section V.

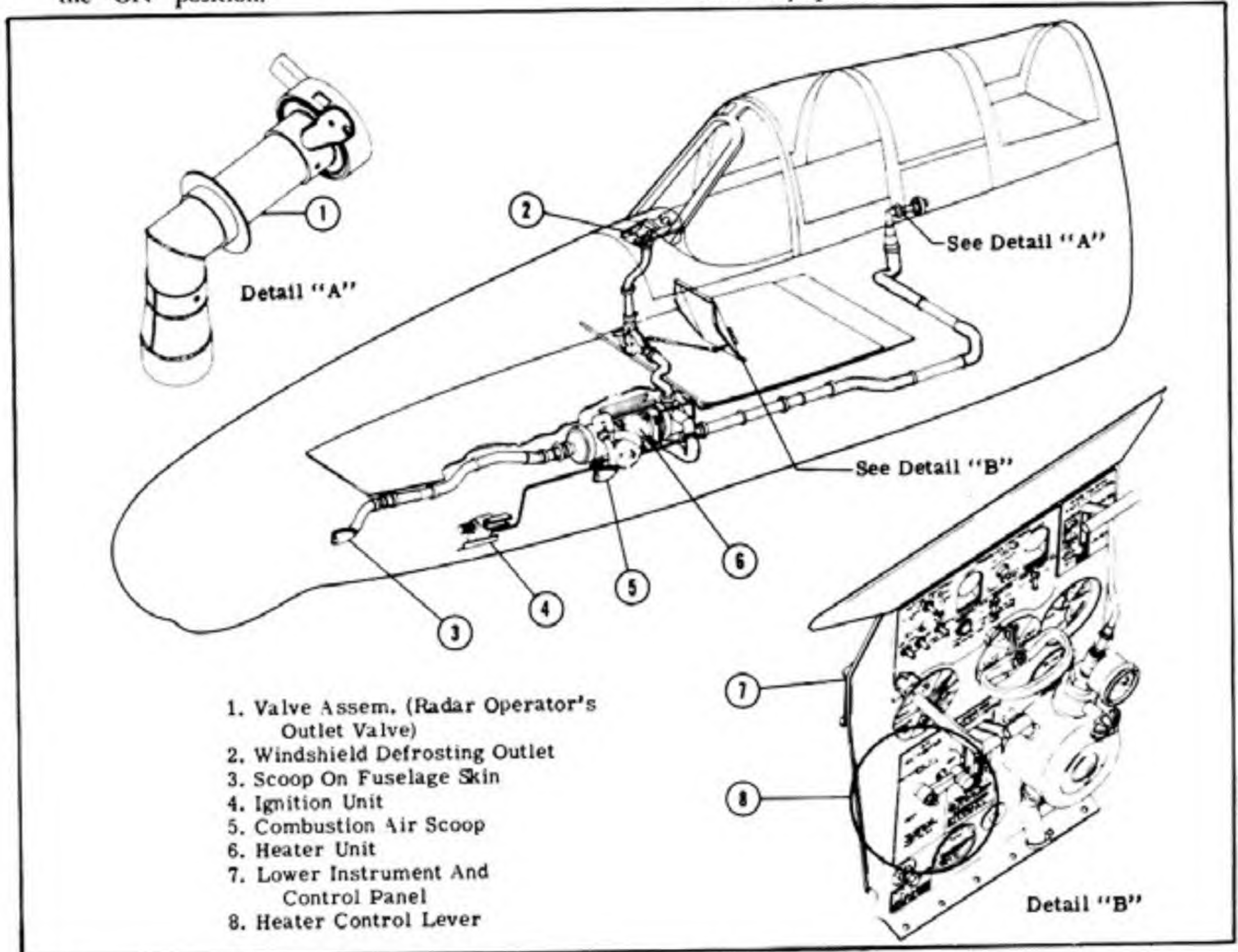


Figure 29A—Cockpit Heater and Defroster Installation

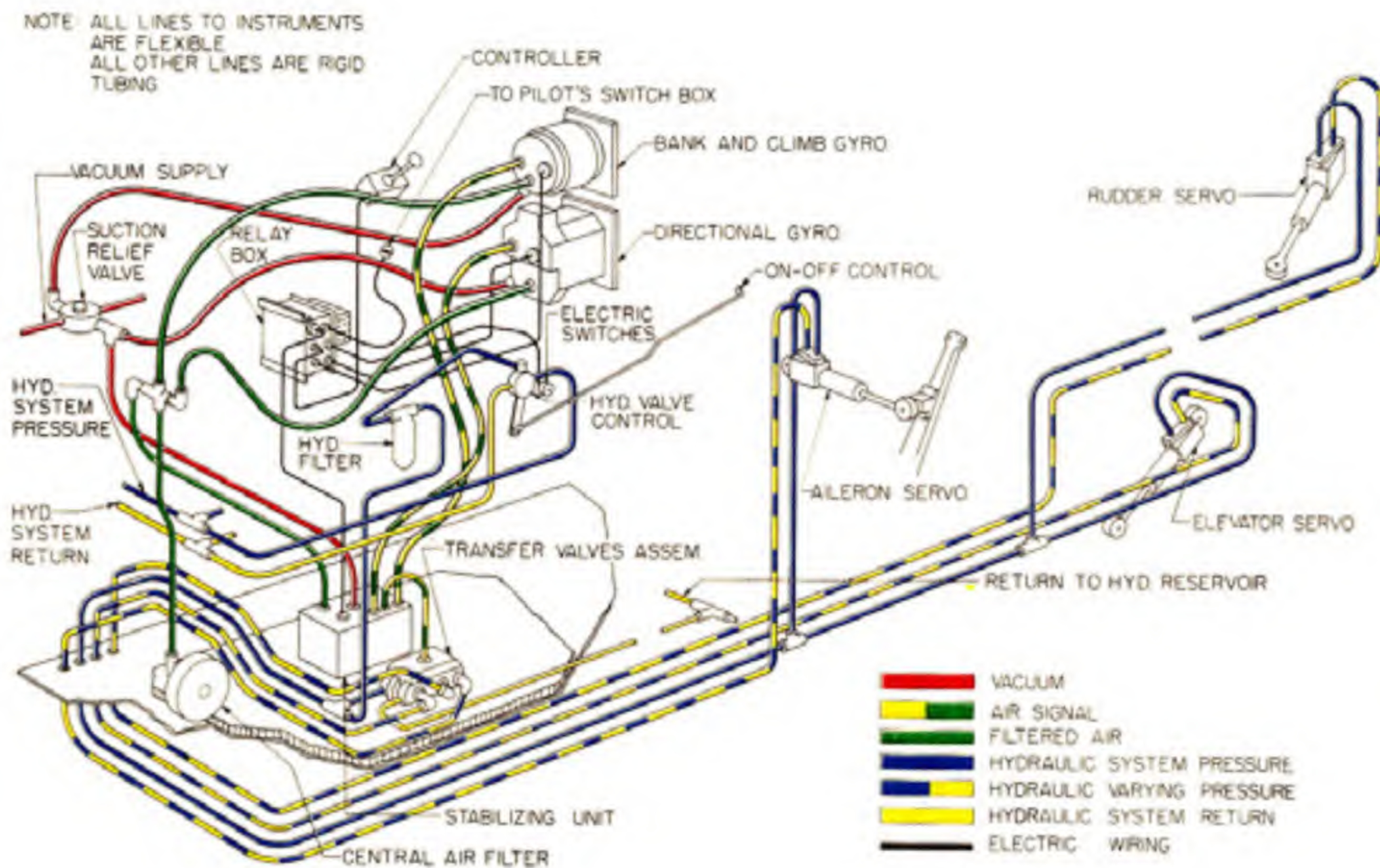
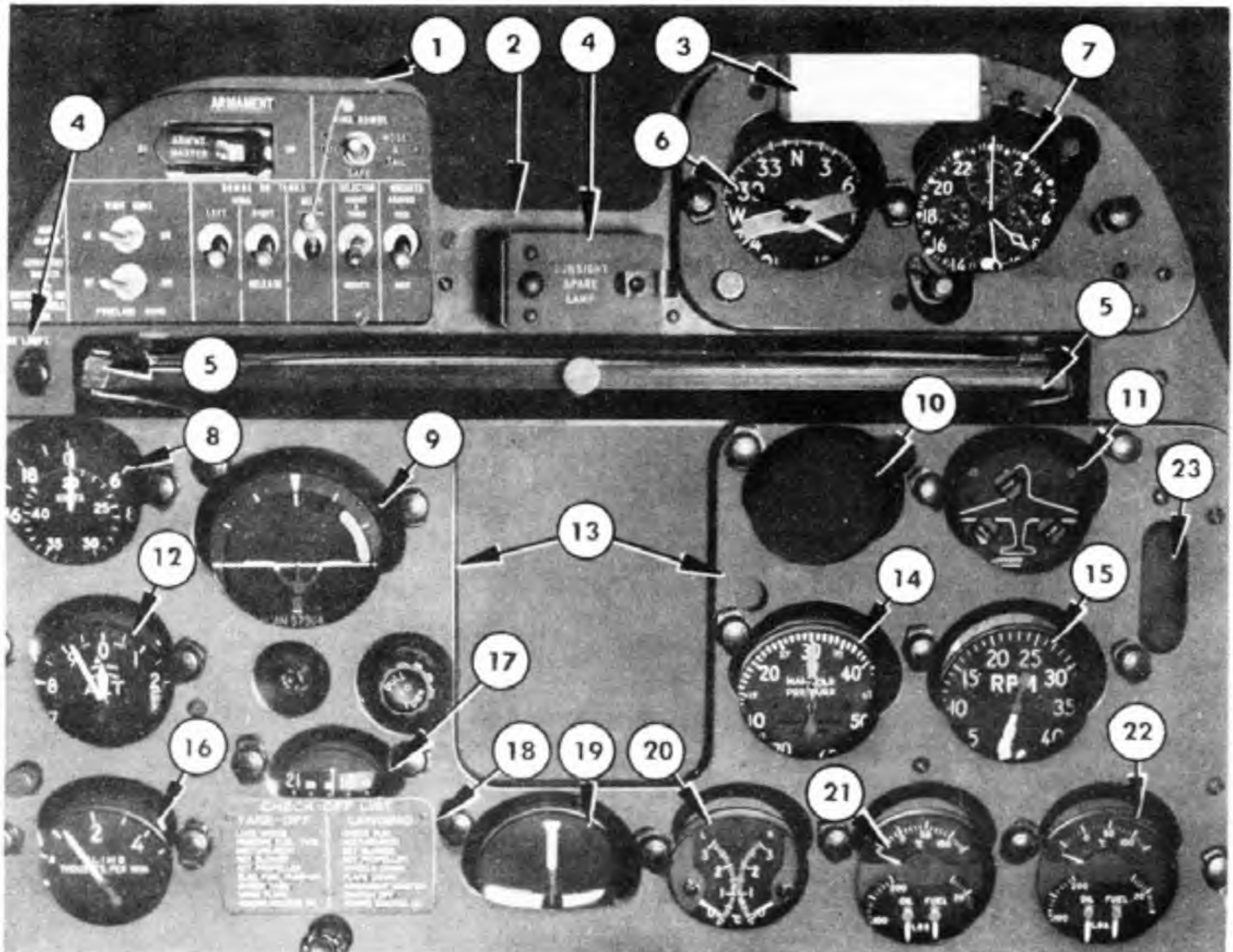
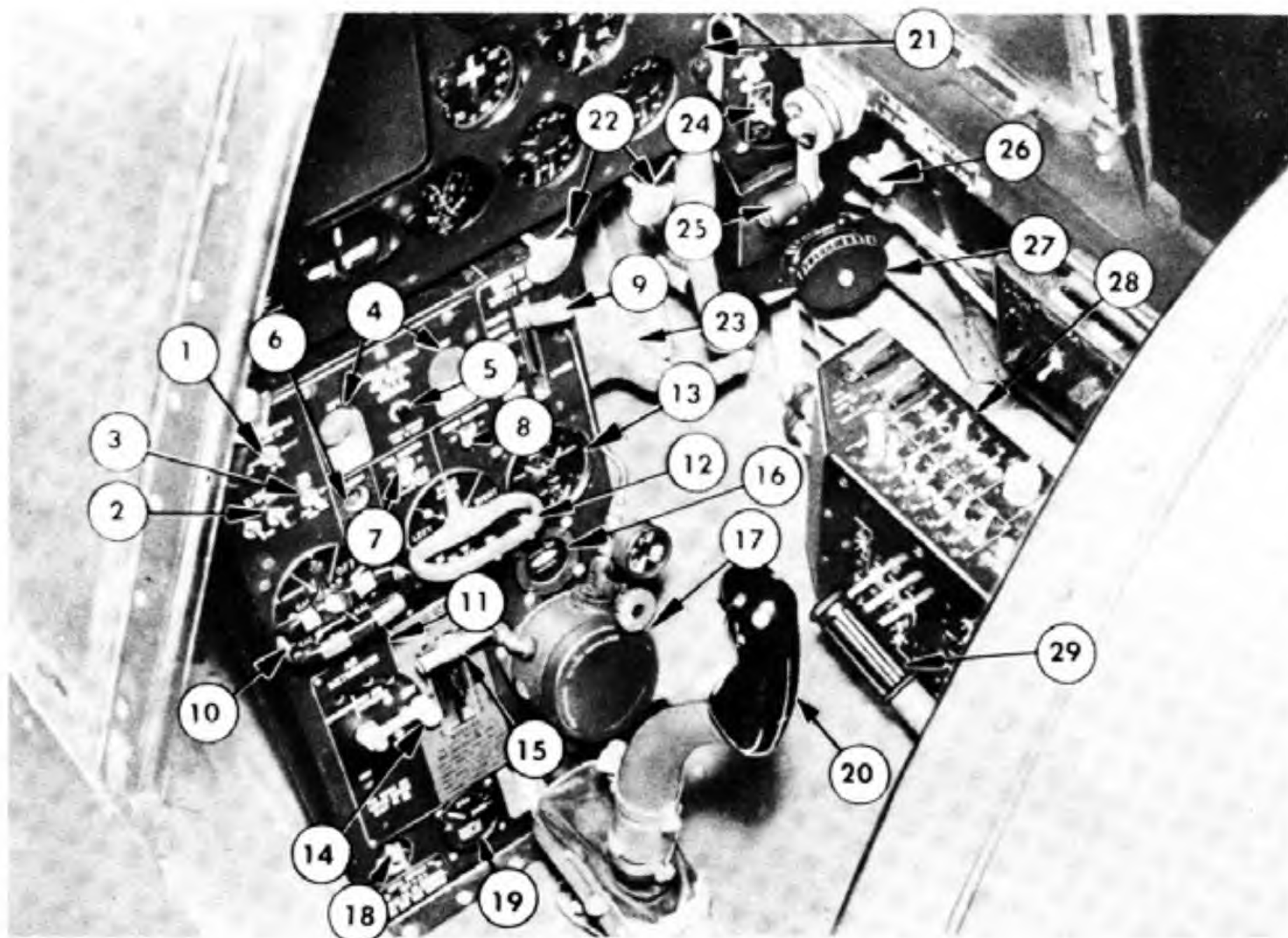


Figure 298—Automatic Pilot (Type GR-1) System Diagram



- | | |
|---|--|
| 1. Armament Switch Panel | 13. Cutout for Radar Indicator |
| 2. Gunsight Cut-out | 14. Manifold Pressure Gage |
| 3. Compass Correction Card | 15. Tachometer |
| 4. Spare Light Bulb Containers | 16. Rate of Climb Indicator |
| 5. Chartboard Rails | 17. Directional Gyro |
| 6. Compass Indicator | 18. Check-Off Placard |
| 7. Clock | 19. Turn and Bank Indicator |
| 8. Airspeed Indicator | 20. Cylinder Head Temperature Gage |
| 9. Gyro Horizon | 21. Left Engine Gage Unit |
| 10. Radio Altimeter Indicator (Night Fighters Only) | 22. Right Engine Gage Unit |
| 11. Landing Gear and Flap Position Indicator | 23. Radio Altimeter Indicator Lights Cut-out |
| 12. Sensitive Altimeter | |

Figure 30—Pilot's Main Instrument Panel

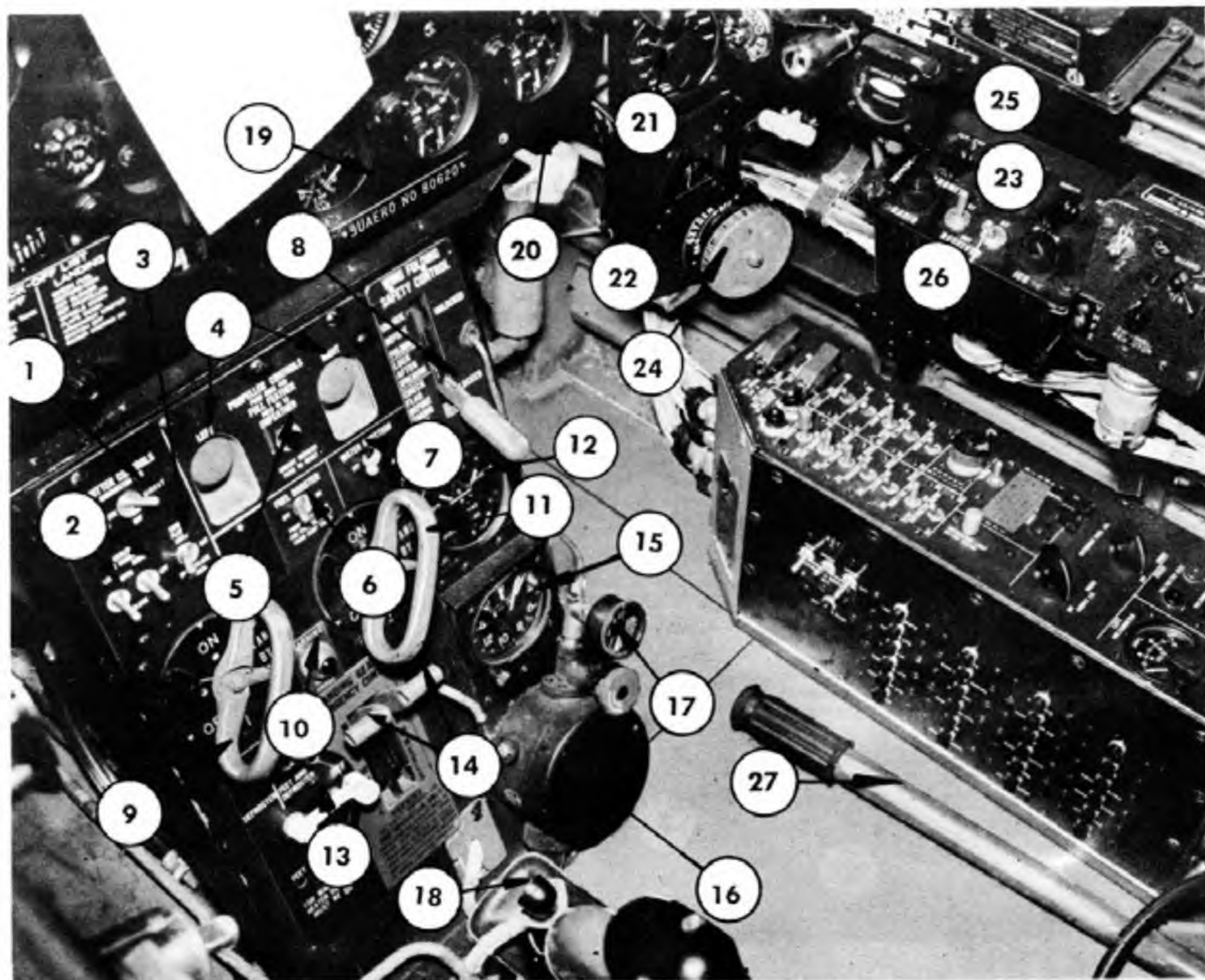


1. Carburetor Air Control Switch
2. Oil Cooler Exit Duct Door Switches
3. Cowl Flaps Control Switch
4. Propeller Feathering Controls
5. Propeller Feathering Circuit Breaker Reset Button
6. Fuel Pressure Warning Light
7. Auxiliary Fuel Pump Control
8. Water Injection Control
9. Wing Fold Safety Lock Control
10. Fuel Tank Selector Valve Control
11. Wing Drop. Tanks Solenoid Valve Control Switch
12. Engine Selector Valve
13. Fuel Quantity Gage
14. Cockpit Heater Selector
15. L.G. (Nose and Main) Emergency Dump Controls

16. Oxygen Flow Blinker
17. Oxygen Regulator
18. Emergency Brake Air Bottle Filler Plug
19. Emergency Brake Air Bottle Gage
20. Control Stick Grip
21. Main Instrument Panel
22. Gun Charger Controls
23. Rudder and Brake Pedal
24. IFF Control Switch (Replaced by Radio Altimeter Control on Night Fighters)
25. Cockpit Hood Control
26. Cockpit Hood Control Release
27. Oxygen Cylinder Control
28. Pilot's Switch Box
29. Hydraulic Hand Pump

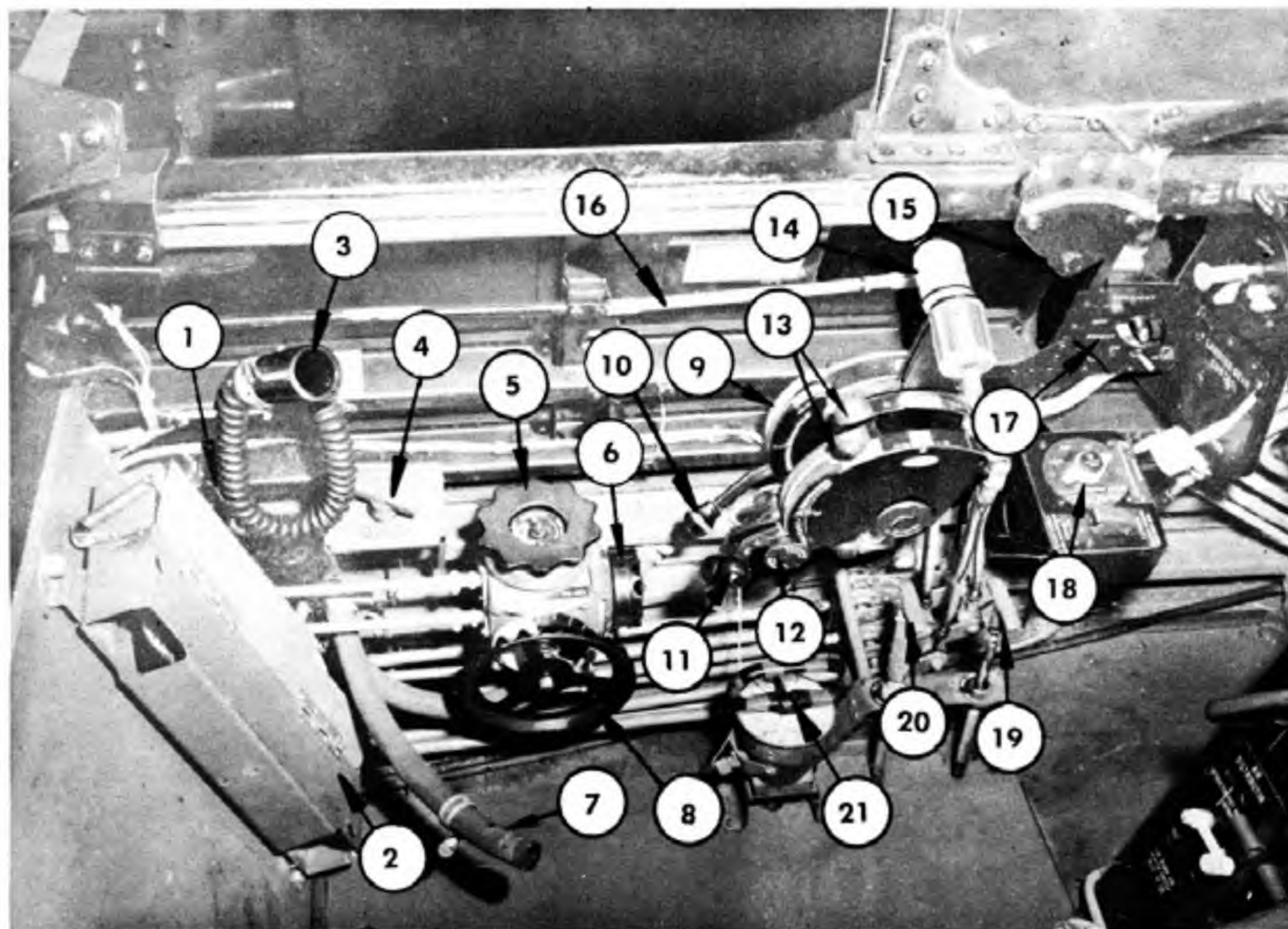
NOTE: Item 16, Oxygen Flow Blinker Relocated to R.H. Cockpit Rail Aft of Hood Handcrank—Replaced by Accelerometer.

Figure 31—Lower and Right Side Instrument Panels—(Ser. Nos. 80259-80607 Incl. Only)



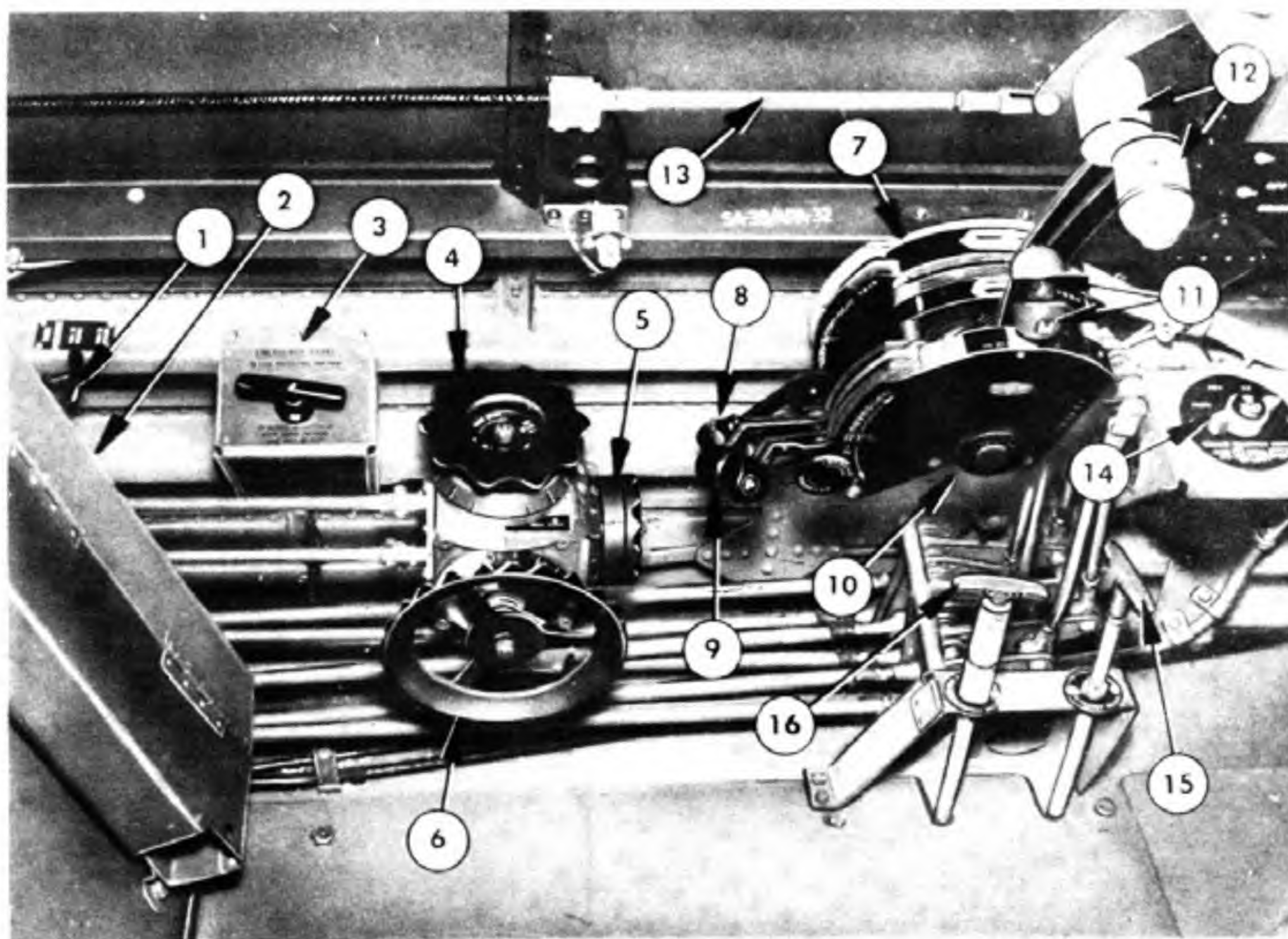
- | | |
|---|--|
| 1. Carburetor Air Shutter Control Switch. | 15. Accelerometer. |
| 2. Oil Cooler Exit Duct Door Switches. | 16. Oxygen Regulator. |
| 3. Cowl Flaps Control Switch. | 17. Oxygen Pressure Gage. |
| 4. Propeller Feathering Controls. | 18. Lower Instrument and Control Panel Light (on Stick). |
| 5. Propeller Feathering Circuit Reset Button. | 19. Main Instrument Panel. |
| 6. Fuel Booster Pump Control. | 20. Gun Charger Control. |
| 7. Water Injection Control. | 21. Radio Altimeter Altitude Limit Indicator Switch. |
| 8. Wing Fold Safety Lock Control. | 22. Stand-by Compass. |
| 9. Left Engine Fuel Selector Valve Control. | 23. Cockpit Hood Release. |
| 10. 30 Minutes Cruise Fuel Warning Light. | 24. Oxygen Cylinder Control. |
| 11. Right Engine Fuel Selector Valve Control. | 25. Oxygen Flow Blinker. |
| 12. Fuel Quantity Gage. | 26. Pilot's Switch Box. |
| 13. Cockpit Heater Selector. | 27. Hydraulic Hand Pump. |
| 14. L.G. (Nose and Main) Emergency Dump Controls. | |

Figure 31A—Pilot's Lower and Right Side Instrument Panels (Ser. No. 80608 and Subs.)



- | | |
|--|--|
| 1. Fuel Tank Pressurizing Release Control. | 12. Friction Adjustment. |
| 2. Map Case. | 13. Mixture Controls. |
| 3. Spotlight. | 14. Throttle Controls. |
| 4. Emergency Brake Control. | 15. Flaps Controls. |
| 5. Rudder Trim Tab Control. | 16. Flaps Control Push-rod. |
| 6. Aileron Trim Tab Control. | 17. Gun Sight Light Switch and Rheostat. |
| 7. Anti-Blackout Equipment. | 18. Rocket Selector Switch. |
| 8. Elevator Trim Tab Control. | 19. Wing Tank-Bomb Manual Release. |
| 9. Engine Control Quadrant. | 20. Fuselage Tank-Bomb Manual Release. |
| 10. Supercharger Control. | 21. Fuel Tank Selector Valve Control. |
| 11. Propeller Controls. | |

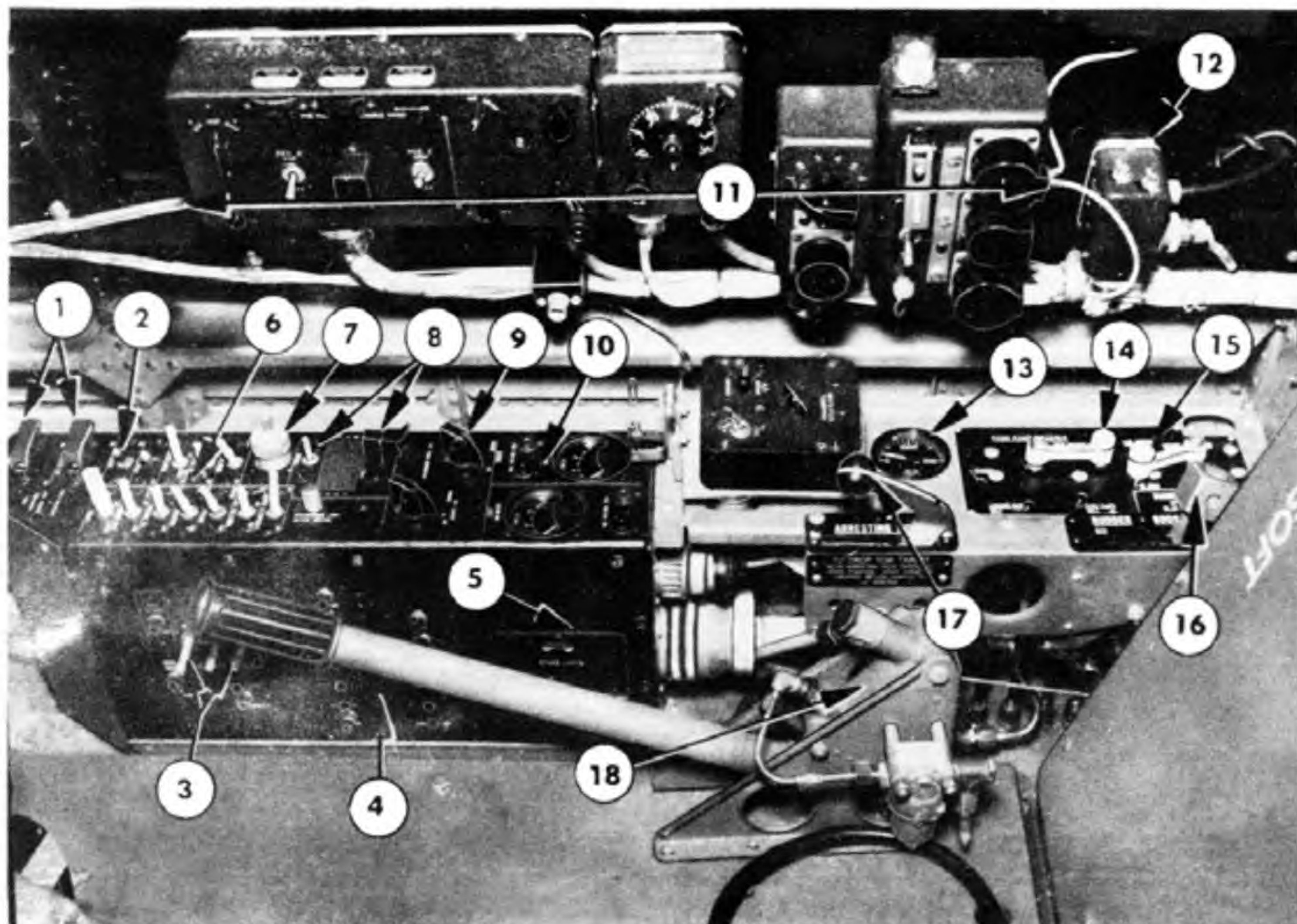
Figure 31B—Pilot's Cockpit—L.H. Side (Ser. No. 80608 and Subs.)



- | | |
|---|---|
| 1. Fuel Tank Pressurizing Release Control | 9. Propeller Controls |
| 2. Map Case | 10. Friction Adjustment |
| 3. Emergency Brake Control | 11. Mixture Controls |
| 4. Rudder Trim Tab Control | 12. Throttle Controls |
| 5. Aileron Trim Tab Control | 13. Flap Control Push-Pull Rod |
| 6. Elevator Trim Tab Control | 14. Rocket Selector Switch |
| 7. Engine Control Quadrant | 15. Wing Tank or Bomb Manual Release (Jettison) |
| 8. Supercharger Control | 16. Fuselage Tank or Bomb Manual Release |

NOTE: Revised Fuel System Tank Selector Valve Control Not Shown—Located on Floor Aft of Drop Tank Release Controls.

Figure 32—Pilot's Cockpit—L.H. Side (Ser. Nos. 80259-30607 Incl. Only)

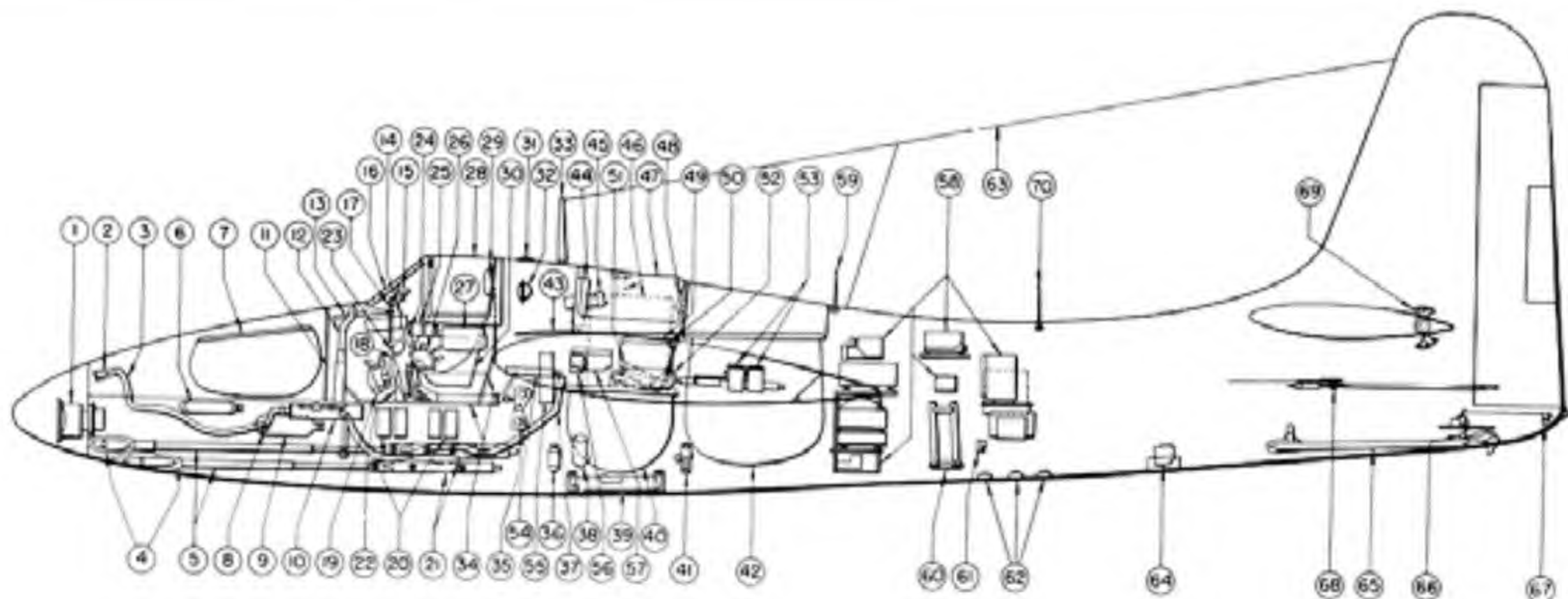


1. Generator Switches
2. Main Battery Switch
3. Recognition Lights Switches
4. Circuit Breaker Reset Buttons
5. Spare Lamp Container
6. Miscellaneous Light and Control Switches
7. Panel Receptacle
8. Primer and Starter Switches
9. Cockpit and Panel Lights Rheostat

10. Volt-Ammeter and Test Pin Jacks
11. Communicating Controls
12. Radio Jack Box
13. Hydraulic Pressure Gage
14. Hydraulic Hand Pump Selector Valve Control
15. Wing Folding Selector Valve Control
16. Rudder Booster By-pass Valve Control
17. Arresting Hook Selector Valve Control
18. Hydraulic Hand Pump

NOTE: Oxygen Flow Blinker Not Shown—Installed on R.H. Cockpit Rail Aft of Hood Hand-crank.

Figure 33—Pilot's Cockpit—R.H. Side

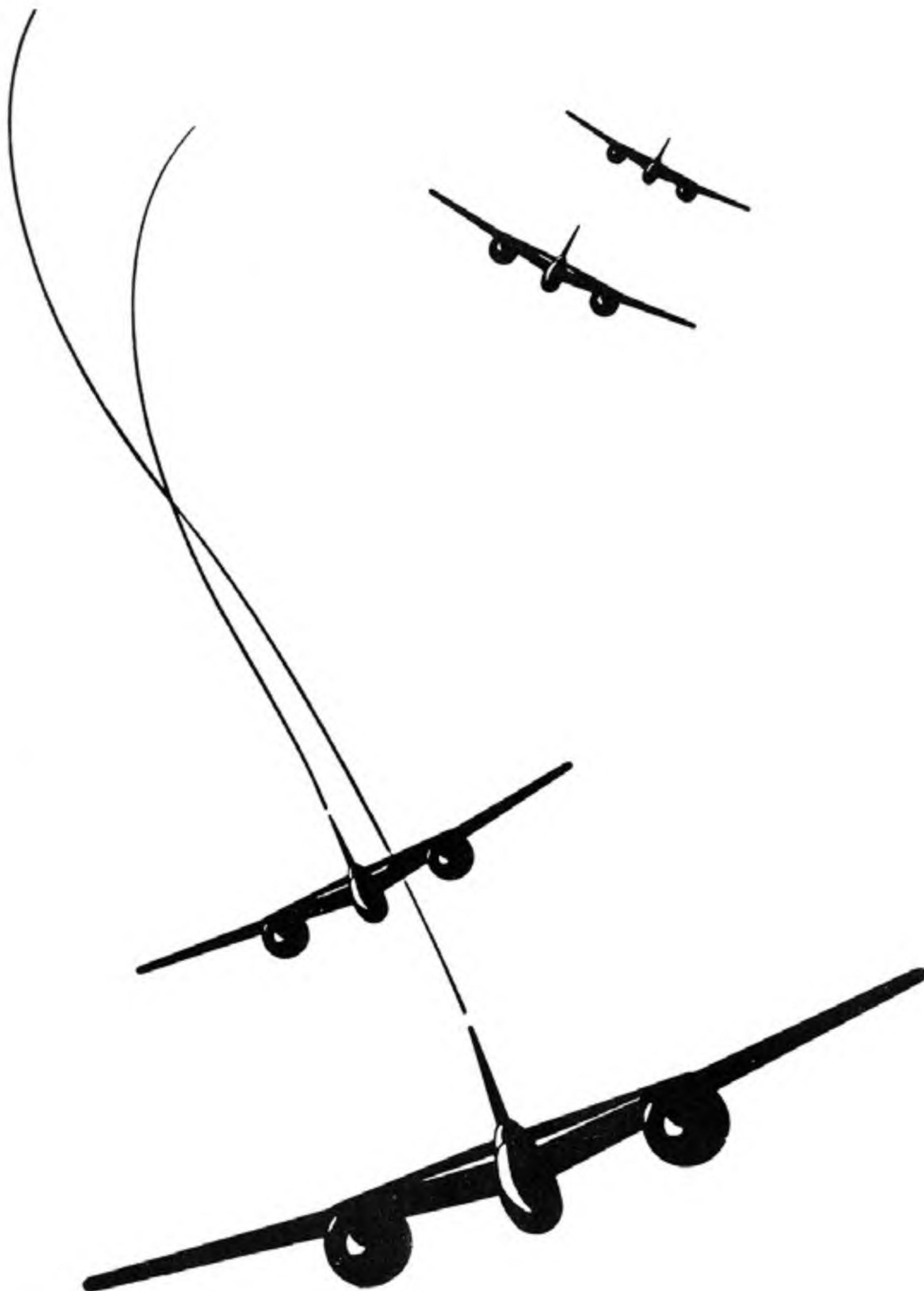


1. Radar Scanner
2. Heater Intake Scoop
3. Heater Intake Tube
4. Blast Tube Fairings
5. Fuselage Gun Blast Tubes
6. L.G. Emergency Dump Air Bottles (2)
7. Auxiliary Fuel Tank
8. Brake Emergency Air Bottle
9. Pilot's Oxygen Cylinder
10. Combustion Heater
11. Pilot's Forward Armor Plate
12. Defroster Duct
13. Pilot's Chartboard
14. Pilot's Radar Indicator
15. Gunsight
16. Bullet Resistant Windshield
17. Pilot's Main Instrument Panel
18. Lower Instrument and Control Panel
19. Rudder and Brake Pedals
20. Fuselage Gun Ammunition Boxes
21. Fuselage Guns—20 Cal.
22. Pilot's Switch Box
23. Gunsight Light Controls

24. Control Stick and Triggers
25. Communicating Controls
26. Engine Control Quadrant
27. Pilot's Map Case
28. Pilot's Cockpit Hood
29. Pilot's Rear Armor (upper plate) and Headrest
30. Pilot's Seat
31. Section Light
32. Warning Howler
33. VHF Mast Antenna
34. Pilot's Rear (lower plate) and Floor Armor
35. Forward Elevator Control Sector
36. Fuel System Reservoir
37. Radar Operator's Heater Duct
38. Electric Auxiliary Fuel Pump
39. Fuselage Bomb Rack
40. Reserve Fuel Tank
41. Fuel Tank Selector Valve
42. Main Fuel Tank
43. Radar Operator's Chartboard
44. Radar Operator's Instrument Panel
45. Radar Operator's Radar Indicator
46. Removable Reserve Fuel Tank

47. Radar Operator's Cockpit Hood
48. Radar Operator's Headrest and Rear Armor Plate
49. Radar Operator's Parachute Pack
50. Radar Operator's Emergency Container
51. Radar Operator's Seat & Life Raft (cushion)
52. Radar Operator's Oxygen Cylinder
53. Wing Guns and Ammunition Boxes (20 mm.)
54. Wing Gun Blast Tubes
55. Main Electrical Distribution Box
56. Radar Operator's Oxygen Regulator
57. Radar Operator's Map Case
58. Communicating Equipment
59. Navigation Antenna
60. Boarding Ladder
61. Remote Compass Inverter
62. Recognition Lights
63. MIF Antenna
64. Remote Compass Transmitter
65. Arresting Hook
66. Arresting Hook Latch
67. Tow Target Latch
68. Rudder Booster Unit
69. Aft Elevator Control Sector
70. IFF Antenna

Figure 34—Interior Arrangement Diagram





SECTION II

NORMAL OPERATING INSTRUCTIONS

1. BEFORE ENTERING COCKPIT.

Note

The following instructions are identical with those issued in Bureau of Aeronautics Technical Order No. 11-47 dated 21 May 1947.

a. The following restrictions are to be observed in the operation of Model F7F-1 series, F7F-2 series, F7F-3 series, and F7F-4 series airplanes.

b. The permissible maneuvers, when not carrying bombs, torpedo, external auxiliary tanks, or similar loads, are the following:

Loop	Immelman turn
Aileron roll	Wing-over
Chandelle	Vertical turn

When carrying bombs, torpedo, external auxiliary tanks, or similar loads, the permissible maneuvers are the following:

Wing-over
Vertical turn
Aileron roll (only for entering dive)

c. The maximum permissible speeds and accelerations are shown on Figure 66 for a gross weight of 21,000 pounds. At other weights the permissible accelerations are such as to maintain a constant product of gross weight and acceleration. These speed and acceleration limits, which have been determined by flight tests, are due to longitudinal and directional instability at higher speeds, and buffeting at higher combinations of speed and acceleration. These manifestations increase in severity as the restricted values are exceeded. For a discussion of such effects, attention is invited to Technical Note No. 20-44, "Compressibility Effects in High Speed Diving".

d. The maximum recommended gross weights for various operations are as follows:

	F7F-1-2-3	F7F-4
Landing on ordinary fields	18,000 lbs.	21,500 lbs.
Routine landing on prepared runways	21,500 lbs.	24,500 lbs.
Field carrier landings (non-arrested)	18,000 lbs.	21,500 lbs.
Catapult launchings	25,000 lbs.	25,000 lbs.
Arrested landings	Not permitted	21,500 lbs.

e. The maximum permissible instrument indicated airspeeds for various operations are as follows:

For use and operation of landing flaps:	
Full down position	130 knots
30° flaps down position	150 knots
15° flaps down position	225 knots
For extending landing gear	250 knots*
For emergency (air) extension of landing gear	110 knots
For flying with landing gear locked down	250 knots

*Gear will not lock down (hydraulic operation) above 180 knots.

Maximum speeds and accelerations for unlimited use of ailerons for entering rolls:

Altitude	Indicated Airspeeds Knots-IAS	Acceleration at 21,000 lbs.
10,000 ft. and below	335	+5.0g
20,000 ft.	275	+3.0g
30,000 ft.	220	+2.0g

At higher speeds aileron operation must be limited to deflections produced by lateral stick forces of progressively small magnitude with increase in speed. The permissible stick force at 425 knots is approximately one-half that at 335 knots. Flight tests have shown that abrupt recovery from a roll imposes higher forces upon the aileron structure than those imposed by similar entry into a roll.

f. Combinations of internal or external useful load items up to and including a 2,000-pound bomb or torpedo on the centerline and a 1,300-pound load on each wing rack may be carried. Permissible speeds and accelerations when carrying these items are those in Figure 66, except that when carrying 150-gallon droppable tanks on the wing racks, the maximum permissible speed is 300 knots IAS at 10,000 or below; at higher altitudes this speed is reduced 25 knots per 5,000 feet. This restriction is due to objectionable buffeting encountered at higher speeds. For details, F7F Aircraft Bulletin No. 28, "General Flight Characteristics with External Droppable Fuel Tanks or 1,000-Pound Bombs Installed on the Wing Bomb Racks", should be consulted. When carrying Tiny Tims or 1,000-pound bombs on the wing racks, similar buffeting may be encountered at speeds below the restricted speeds shown on Figure 66.

g. Model F7F-1, F7F-2, and F7F-3 airplanes are hereby continued as restricted against carrier landings and arrested landings ashore. Non-arrested field carrier landings may be made, but should be made at an approach speed of at least 85 knots IAS. During such landings the rate of descent should be reduced to a minimum immediately prior to wheel contact; landings involving a high rate of descent shall not intentionally be made.

h. Arrested landings are permitted for Model F7F-4 airplanes, only, at gross weights up to the maximum given in paragraph d. Pending tests, arrested landings with external stores are not authorized. However, arrested landings are permitted with *completely empty* droppable fuel tanks installed on the wing racks *only*. Arrested landings with a droppable fuel tank installed on the centerline rack are prohibited in carrier operation, since the reliability of the Mark 5 barrier adapters for the F7F-4 series airplanes is compromised by the centerline tank installation.

i. Catapult launchings are permitted at gross weights up to the maximum given in paragraph d and with external stores consisting of any symmetrical combination of droppable fuel tanks listed below:

(1) One 300-gallon or one 150-gallon droppable fuel tank on the centerline rack with or without two 150-gallon droppable fuel tanks on the wing racks.

(2) Two 150-gallon droppable fuel tanks on the wing racks.

Pending tests, catapulting with other external stores is not authorized. Strength provisions for catapulting are incorporated in the F7F series beginning with F7F-3 Bureau of Aeronautics Serial Number 80459. Earlier airplanes of this series are not designed or equipped for catapulting.

These limitations and restrictions are subject to change and latest service directives and orders must be consulted.

j. Check Gross Weight and C.G. location for take-off and for anticipated loading for landing. Loading data is furnished in the Handbook of Weight and Balance Data, AN 01-1B-10.

k. **ENTRANCE TO AIRPLANE.**—A boarding ladder is installed in the right hand side of the fuselage, just aft of the wing trailing edge between station no. 347 and station no. 362. When the step, directly above the ladder opening, is pushed in, the ladder is automatically released to slide down from the fuselage. To reach the cockpits, mount the ladder (left foot first) and using the step and handgrips, proceed forward over the wing. The ladder must be pushed back into the fuselage by the ground crew.

To open the pilot's cockpit, push the red release button below the hood and pull the hood aft.

To open the radar operator's cockpit, release the finger latch on the hood frame and lift the hood.



Figure 35—Ladder and Steps

2. ON ENTERING PILOT'S COCKPIT.

a. STANDARD CHECK FOR ALL FLIGHTS.

- (1) Controls lock device—OFF.
- (2) Ignition switch—OFF.
- (3) Mixture controls—IDLE CUT-OFF.
- (4) Wheels chocked (main wheels only).
- (5) Check stick and pedals for free movement through full throw.
- (6) Adjust seat.
- (7) Battery switch—ON.
- (8) Check fuel and oil supplies.
- (9) Check communicating equipment.
- (10) Check gun sight light.
- (11) Check oxygen equipment.

- (12) All armament switches—OFF.
- (13) Gun charging handles to—SAFE.
- (14) Check ammunition loading.
- (15) Set sensitive altimeter.
- (16) Gyro-horizon—uncaged.
- (17) Directional gyro—uncaged.
- (18) Check propellers for clearance.

b. SPECIAL CHECK FOR NIGHT FLIGHTS.

- (1) Battery switch—ON.
- (2) Instrument panel and cockpit lights—turn on and adjust to best light.
- (3) Test operation of following switches and lights:
 - (a) Approach (operate hook).
 - (b) Landing.
 - (c) Wing running.
 - (d) Tail running.
 - (e) Formation.
 - (f) Section.
 - (g) Formation and section.
 - (h) Recognition (operate keying switch).
- (4) Check radar equipment. (Refer to section V).

3. FUEL AND OIL SYSTEM MANAGEMENT.

a. FUEL SYSTEM—SER. NO. 80259-80607 INCL.

(1) Set engine selector valve on BOTH—since this system is not a cross-feed type the valve should be on BOTH, for operation, at all times except in the case of damage or fire when the valve should be set on the operating engine.

(2) Set tank selector valve on RESERVE—the carburetor bleed-back (vapor vent) lines return 8-10 gallons per hour to the reserve tank. Also when the fuel transfer system is in operation, fuel at the rate of 60 gallons per hour is fed to this tank. Therefore, as space must be made to accommodate this return fuel, use this tank first to avoid waste by overflow.

After warm-up, take-off, climb and leveling off, switch tank selector valve to WING DROPPABLE, FUSELAGE DROPPABLE, AUXILIARY, then MAIN tank as necessary.

CAUTION

This sequence of use of tanks is suggested but may be altered as required. Since the bleed-back and fuel transfer system direct flow to the reserve tank, its use for warm-up and take-off makes space available. When operating on droppable tanks, check quantity gage frequently for reserve tank load. If gage shows tank near full (185 gals. with and 105 gals. without removable tank) set selector valve to RESERVE and operate for sufficient time to provide space for further bleed-back and transfer.

(3) Turn fuel booster pump—ON (refer to Section 1, paragraph 3, Fuel System).

(4) Primer switch — flick ON intermittently. This switch operates primer solenoid when booster pump is ON.

(5) Changing tanks in flight—

(a) Fuel booster pump switch—ON.

(b) Tank selector valve—TO TANK DESIRED.

Note

Be sure detent clicks into place control definitely in place). When using Wing Drop Tanks—set toggle selector as desired before setting tank selector valve to WING DROP TANK.

(6) Fuel pressurizing—operation of this system is fully automatic at all times. Pull "T" handle to cut-off system only in armed combat or in the event of cell damage.

Note

The pressure warning light on the pilot's lower control panel glows when the pressure drops below 17 ± 1 psi.

Refer to Section 1, paragraph 3, Fuel System, for further information.

b. FUEL SYSTEM—SER. NO. 80608 AND SUBS.

(1) Set fuel selector valves to "ON". Since this is not a cross-feed system both selectors should be at "ON" at all times, except in case of damage to the main tank, when both should be set at "STAND-BY", or in case of an inoperative engine when the valve for that engine should be set at "OFF".

(2) Set tank selector valve to any tank. Be sure detent clicks into place (control definitely set in place).

(3) Turn fuel booster pump switch to "ON".

(4) Primer switch—flick ON intermittently.

(5) Fuel Pressurizing—Operation of this system is fully automatic at all times. Pull "T" handle to cut-off system only in armed combat or in the event of cell damage.

Refer to Section 1, paragraph 3(d) Fuel System for further information.

c. OPERATION OF OIL SYSTEM.—The operation of these independent systems is entirely automatic except for the oil dilution and the setting of the cooler exit duct doors. The duct doors are controlled by switches on the pilot's lower control panel. Refer to Section 1, paragraph 4, Oil System, and paragraphs below for settings.

The oil dilution system (when installed) is controlled by a switch on the pilot's electrical control panel. Refer to Section 1, paragraph 4, Oil System, and paragraph 18.j., this section.

4. STARTING ENGINES.

a. With ignition and battery switches OFF, manually rotate propellers four or five times.



HOLD STARTER SWITCH ON UNTIL ENGINE TURNS UNDER ITS OWN POWER

Note

If engines have been idle for an hour or more, it may be necessary to remove plugs from the lower cylinders to expel accumulated oil.

b. BATTERY SWITCH—ON.

c. MIXTURE—IDLE CUT-OFF.

d. FUEL TANK SELECTOR.

Airplanes Ser. No. 80259-80607 incl.—RESERVE TANK.

Airplanes Ser. No. 80608 and subs.—ANY TANK.

e. ENGINE SELECTOR—Ser. No. 80259—80607 incl.—BOTH ENGINES.

f. FUEL SELECTORS (2)—Ser. No. 80608 and subs.—ON (BOTH).

g. SUPERCHARGER—LOW.

h. CARBURETOR AIR—NORMAL.

i. COWL FLAPS—FULL OPEN.

j. OIL COOLER EXIT DOORS—OPEN.

k. GENERATORS—ON.

l. PROPELLERS — FULL INCREASE (take-off RPM).

m. THROTTLES—800-1000 rpm (approx.)

n. FUEL BOOSTER PUMP—ON.

Note

When starting engines see that fuel pressure gage indicates 22 ± 1 psi. Do not leave fuel booster pump switch on any longer than necessary for priming the engine that is being started. Prolonged running of the booster pump may flood the carburetor of the dead engine if the IDLE CUT-OFF feature is not operating properly.

o. RIGHT ENGINE.

(1) PRIMER SWITCH—to LEFT to ON.

CAUTION

Flick intermittently when using fuel booster pump.

(2) IGNITION SWITCH—ON—BOTH magnetos (right engine).

(3) STARTER SWITCH—to RIGHT to ON.

(4) MIXTURE CONTROL, RIGHT ENGINE ONLY—advance to AUTO-RICH as engine fires. If engine fails to continue running, return to IDLE CUT-OFF.

p. LEFT ENGINE.

(1) PRIMER SWITCH—to LEFT to ON.

(2) IGNITION SWITCH—ON—BOTH magnetos (left engine).

(3) STARTER SWITCH—to LEFT to ON.

(4) MIXTURE CONTROL, LEFT ENGINE ONLY—advance to AUTO-RICH as engine fires—if engine fails to continue running, return to IDLE CUT-OFF.

q. IDLE BOTH ENGINES—at 1000 r.p.m.

CAUTION

Never run engine oil pressure over 200 p.s.i. during warm-up.

If the oil pressure gage indicators do not show pressure within 30 seconds stop engines and investigate. In cold weather, due to the long oil pressure gage lines, full oil pressure may not read for several minutes. If the oil dilution system has been used, prior to shutting down, warm up engine sufficiently before take-off so that oil system is operating efficiently, except in cases of extreme emergency. As the oil operating the hydromatic propellers has not been diluted, take care to see that the propeller pitch changing mechanism is operating properly.

5. WARM-UP AND GROUND TEST.

a. Open throttles to 1200 r.p.m. until oil-in-temperature reaches 40°C (104°F). A drop in oil pressure when the throttle is opened indicates that further warm-up is required.

b. CHECK MAGNETOS.

(1) When oil-in temperature is in 50°-60°C (122-140°F) range, run engine at 32" Hg. M.P.

(2) Operate on each magneto for shortest possible time. If r.p.m. drop exceeds 75-100 stop engines and investigate.

CAUTION

Return switch to BOTH between checks to clear engines.

c. SUPERCHARGER CHECK AND DESLUDGING PROCEDURE.—The supercharger check should never be made nor the clutches desludged until the oil tem-

perature has reached 40°C (104°F), and it is preferable to wait until the oil temperature has reached 60°C (140°F). If there is not enough time to complete a regular supercharger check, desludge the clutches twice as directed in paragraph (4) below.

(1) Adjust the throttle to obtain 1400 r.p.m.; then move the supercharger control rapidly into the "HIGH" position. Never stop movement of the control between the "LOW" and "HIGH" positions.

(2) Advance the throttle to obtain 30 in. Hg. and note the tachometer reading as soon as the manifold pressure has stabilized. Remain in high blower for a minimum of 30 seconds.

(3) Move the supercharger control from "HIGH" to "LOW," and readjust the throttle to obtain 30 in. Hg. Note the tachometer reading as soon as the manifold pressure has stabilized. If the supercharger is operating correctly, the r.p.m. in low blower will be higher than the r.p.m. in high blower for the same manifold pressure.

(4) To complete the desludging of the clutches, readjust the throttle to obtain 1400 r.p.m., and move the supercharger control into the "HIGH" position. After 30 seconds in "HIGH," return the supercharger control to "LOW."

d. CHECK PROPELLER CONTROLS.—With engine speed at 2100 r.p.m. move control to "DECREASE R.P.M." until a drop of 350-400 r.p.m. approx. is indicated, then return control to full "INCREASE R.P.M.". The constant speed range of the governor is between 1200 and 2800 r.p.m.

e. CHECK PROPELLER FEATHERING CONTROLS.—Run engine to be feathered at 2100 r.p.m., push feathering button and, as soon as drop in r.p.m. is noted, pull button out.

f. CHECK CARBURETOR IDLE MIXTURE.—With the throttle closed and the propeller governor control in full "INCREASE RPM" the engine should idle at 600 r.p.m. Move the mixture control lever momentarily, but with a smooth steady pull, to the idle cut-off position and observe tachometer for any change in r.p.m. A momentary rise above 10 r.p.m. indicates too rich a mixture; no change indicates too lean a mixture. A 5-10 rpm rise is desired. Use 800 rpm if tachometer fluctuations are excessive at 600 rpm.

g. CHECK INSTRUMENTS, RUNNING ENGINES AT 2000 RPM IN LOW PITCH.

(1) Oil temperature 60°-85° C.

- (2) Oil pressure 85-90 psi.
- (3) Fuel pressure 22 ± 1 psi.
- (4) Cylinder head temperature 232°C (450°F max).
- (5) Note MP as reference for future checks.

Note

Fuel pressure (22 ± 1 psi) is relative to carburetor air pressure. It may drop to 12 psi at low r.p.m. This is normal, if pressure rises when r.p.m. is increased to 800 or 1000.

b. CHECK FUEL PUMPS.—Set fuel booster pump switch to OFF, and see that gage indicates 22 ± 1 psi.

i. CHECK HYDRAULIC PRESSURE GAGE.—1250-1500 psi.

j. RUDDER BOOST SHUT-OFF CONTROL.—ON.

k. WING SPREADING. — (Jury struts removed.)

- (1) Set control to SPREAD.
- (2) Safety lock to LOCKED.
- (3) Check position of red signal (retracted).



CHECK WING FOLDING SIGNALS BEFORE TAKE-OFF

l. FLAPS.—Operate flaps control—check to see that flaps operate properly (4 flaps move simultaneously). Check position on cockpit indicator.

CAUTION

The flaps are not interconnected mechanically but are actuated by individual hydraulic cylinders operated by a single control—it is possible that dirt may lodge in parts of the installation on a new or overhauled airplane and prevent one of the flaps from extending or retracting. Therefore, check for proper operation before take-off and lower in the air at a safe speed and altitude.

m. CHECK EMERGENCY AIR BRAKE PRESSURE.—1800 psi (gage on lower control panel)

n. CHECK GENERATOR SYSTEM.

- (1) Disconnect external power, if used.
- (2) With engines idling turn on cockpit lights or some other system load.
- (3) Turn on one generator switch.

(4) Slowly increase speed of one engine and watch corresponding voltmeter. Reading should increase to 26.5 (approx.) volts when a slight dip will be noted indicating the closing of the reverse current cut-out. As speed is further increased voltage should reach 28.0 volts and remain constant regardless of further increase in engine r.p.m.

(5) Check other generator by reversing switch settings and repeating the operation.

(6) Defective operations is indicated (which should be corrected before take-off) if:

(a) Voltage dip at 26.5 (approx.) is not noted for either generator, indicating reverse current cut-out has not closed.

(b) Either voltmeter reading is above 28.5 or below 27.5.

o. AUTOMATIC PILOT CHECK.

(1) Run engines at 1500 rpm (minimum) for full vacuum.

(2) Uncage the bank and climb gyro.

(3) Uncage the directional gyro.

(4) Center the stick and pedals. Engage automatic pilot by pulling on-off handle to the "ON" position. (The handle is located on the left side of the cockpit, forward of the wing flap control lever.)

(5) When the automatic pilot is turned "ON", the controls of the airplane should jar slightly but not move violently. This checks synchronization.

(6) Move the control lever on the controller unit to the left and right, and fore and aft. Hold in each position for a short period of time. The airplane control stick should move correspondingly. (The controller is located on the right hand shelf in the cockpit.)

(7) Depress the button on the control lever; then, cage directional gyro and turn slowly to left and right. Rudder should move accordingly. After check, reset and uncage gyro.

(8) Check centralization by moving the control stick to a position other than neutral and then pulling the on-off control handle to "CENTRALIZED" position. The electrical system should cause the motors in the gyro control units to run briefly and then come to a stop.

(9) Check to be sure that the automatic pilot can be overpowered with on-off control handle in the "ON" position. After this check, disengage the automatic pilot by pushing on-off control handle to "OFF".

(10) Disengage automatic pilot by pushing on-off control handle to "OFF" position.

p. CHECK RADIO EQUIPMENT CONTROLS.—Refer to Section V.

q. PITOT HEAD HEATER.—On if icing conditions prevail.

r. COCKPIT HOOD.—Open.

s. LANDING LIGHT.—Check position (OFF).

t. BOARDING LADDER.—Stowed.

6. SCRAMBLE TAKEOFF.

An emergency take-off may be made in accordance with the regular take-off procedure provided that;

- a. Oil pressure is steady.
- b. Oil temperature—at least 40°C (104°F).
- c. Throttle may be advanced without causing engine to cough or cut out.

7. TAXIING INSTRUCTIONS.

The nose wheel swivels through 360°, but is equipped with a centering device which acts to return it to the trailing position. Motion of the airplane is necessary before the nose wheel casters. Apply even power to the engines to begin rolling and control the rolling speed by throttling the engines and applying

the brakes. Steer the airplane by differential braking and use of engines. Abrupt and sharp turns will cause uneven tire wear and should be avoided. Once the airplane has begun to roll, it can be stopped only by braking and retarding both engines, as the thrust of one idling propeller is sufficient to overcome rolling friction. The pilot should familiarize himself with brake operation and should thoroughly understand the hydraulic system and emergency air system in case of line or pump failure. Taxi slowly over rough ground—sinking of the nose wheel causes the C.G. to move forward and impose undue loads on the nose wheel. If possible avoid rocks, ditches, etc. Forward loads may be minimized by using full up elevator and minimum braking. As speed increases, the nose wheel action stabilizes, (ground looping is impossible) and normal control is attained, by using the rudder, dif-

ferential engine, and brakes, or all three together. Use the first two whenever possible to minimize brake wear.

To stop rolling, retard throttles, apply the brakes evenly, and reduce braking gradually to lessen pitching. Taxi to take-off position, allowing airplane to roll a few feet in the direction of take-off to straighten nose wheel. When taxiing across wind, control the airplane by carrying less power on the lee engine.

CAUTION

Do not taxi with wings folded without jury struts in place.

8. TAKE-OFF.

a. Refer to TAKE-OFF, CLIMB AND LANDING CHART, Appendix I.

b. Check-off list.

- (1) Traffic clearance.
- (2) Shoulder harness—SECURED and LOCKED.
- (3) Wings—SPREAD and LOCKED.



DON'T TAXI THROUGH ANYTHING!

- (4) Landing light—OFF.
- (5) Pitot head—ON (if icing).
- (6) Cockpit hood — OPEN (close before 140 knots).
- (7) Boarding ladder—STOWED.
- (8) Rudder booster—ON.
- (9) Cowl flaps—AUTOMATIC (open).
- (10) Oil cooler exit duct doors—OPEN.
- (11) Carburetor air—NORMAL.
- (12) Propellers—INCREASE.
- (13) Mixture—AUTO-RICH.
- (14) Supercharger—LOW.
- (15) Engine Selector—Ser. No. 80259 - 80607 incl. BOTH.
Fuel Selectors—Ser. No. 80608 and subs.—ON both.
- (16) Tank Selector—Ser. No. 80259—80607 inc.—RESERVE.
Ser. No. 80608 and subs.—ANY TANK.
- (17) Fuel booster pump—ON.

- (18) Tabs control settings—ALL NEUTRAL.
- (19) Flaps setting—AS REQUIRED.

Note

Flaps may be set in any one of the four positions. Airplane can become airborne in 500 feet (approx.) with zero wind and flaps FULL DOWN (40°).

c. Hold airplane with brakes until 30-40" Hg. M.P. is indicated on both engines, then release. Before 20 to 30 knots speed is reached, directional control can be maintained easily with brakes or engines; at approximately this speed, rudder control and castering become effective. During the first part of the roll, it is desirable to lift the nose wheel slightly clear of the ground in order to obtain better directional control with the rudder. If a short take-off must be made, the airplane may be dragged off at low speed. However, for normal field operation it is recommended that the airplane be flown off at high speed to insure better control in the event of engine failure. Minimum speed for take-off is 57-70 knots approximately—normal speed is 75-80 knots. For shortest ground run, and for safe clearance of obstacles, use full flaps. Since the C.G. is only slightly forward of the main wheels, smaller elevator stick forces are necessary, as the wheel load changes to wing load. Allow the airplane to accelerate to 140 knots I.A.S. before starting climb to insure control if one engine should fail. Minimum indicated airspeed of 120 knots is necessary for rudder control if one engine fails.

d. Open throttles to 53.5" Hg. M.P. for five minutes only.

e. Immediately after leaving the ground RAISE LANDING GEAR.

f. RAISE FLAPS.

g. Adjust power plant according to the POWER PLANT CHART, Section III.

9. ENGINE FAILURE DURING TAKE-OFF.

a. If one or both engines fail before airplane is airborne close both throttles and apply brakes.

b. If one or both engines fail after take-off but before 120 knots I.A.S. is reached:

- (1) Close both throttles.
- (2) Land straight ahead.

(3) Retract landing gear if landing must be made beyond field limits, on soft or rough ground, or in water.

c. If one engine fails, and 140 knots I.A.S. is reached or sufficient altitude has been attained:

- (1) Nose down to pick up flying speed (120 knots is minimum for control with one engine).
- (2) Rudder into running engine.
- (3) Drop wing as fast as possible on side toward running engine.

- (4) Close throttle of dead engine and feather the propeller.
- (5) Check that landing gear is up, or coming up.
- (6) Set rudder tab to hold straight course.
- (7) Engine or fuel selector—good engine only.
- (8) Mixture control (dead engine) IDLE CUT-OFF.
- (9) Ignition switch of dead engine to OFF.
- (10) Lower landing gear during final approach.
- (11) Circle field, turning toward good engine, maintaining speed and make engine assisted approach at 120 knots I.A.S. minimum.

(12) To avoid excessive rudder force, reduce rudder tab as speed falls off in final approach. The tricycle landing gear makes it possible for this airplane to be flown in at a higher speed than an airplane equipped with the two-wheeled landing gear.

CAUTION

Do not lower wheels until final approach.
Do not lower flaps until certain the field can be reached.

If engine failure is due to fuel pressure loss as indicated by the gage (and the booster fuel pump is ON) a break in the fuel line is probable. Make certain that the engine or fuel selector valve is set to cut off the bad engine.

With the left engine dead (the critical condition), and windmilling at 2400 r.p.m., and the right engine operating at 75% power, the minimum speed necessary for straight flight and landing is 120 knots. At this speed, little aileron is necessary to oppose rolling tendencies.

With the left propeller feathered, and the minimum speed for straight flight 113 knots approximately, $\frac{1}{3}$ aileron deflection is necessary to maintain straight and wing level flight. All rudder forces can be held easily with the rudder booster on, and fairly easily with the booster off.

At 151 knots approximately all forces can be trimmed out with tabs, for cruising, and a fair rate of climb can be maintained.

10. CLIMB.

a. Reduce manifold pressure to 41" Hg. approximately and r.p.m. to 2600 as soon as practicable.

b. Check that oil cooler duct doors are open and cowl flap control switch is in AUTOMATIC.

Refer to Section III, power plant chart and Appendix I—take-off, climb and landing chart, and flight operation instruction chart for best climbing speed, power settings, range, etc.

Maximum permissible cylinder head temperature 260°C (502°F).

Maximum permissible oil temperature 95°C (203°F).

Note

Full military power is permissible for five minutes but it is not good practice unless absolutely necessary.

11. GENERAL FLYING CHARACTERISTICS.

a. GENERAL.—Refer to Appendix I—flight operation instruction chart, for cruising speed, fuel consumption, etc. Cruising operations may be conducted at any engine power below normal rated power but if minimum fuel consumption is important, and, if it is tactically feasible, cruising operations should be conducted in a range not exceeding the maximum cruise settings given in the Power Plant Chart.

The engines should be operated in AUTO-LEAN for cruising power operation as shown on the power plant chart. If 232°C (450°F) cylinder head temperature is exceeded, the mixture should be enriched.

Do not exceed the cruising M.P.—r.p.m. relationships specified in the chart.

Set tabs controls for best trim.

If droppable tanks are carried, fuel from them should be used up before that from the AUXILIARY and RESERVE tanks. Remember that the bleed-back from the carburetor vapor vent lines returns 8-10 gallons per hour. Refer to Section II, paragraph 3, Fuel Management.

General flight characteristics of this airplane are good. Stick forces in most flight maneuvers are light and controllability is good. On F7F-3N and F7F-4N type airplanes, however, elevator stick forces for landing and take-off are fairly heavy. Very little change in trim is apparent with changes of speed and power.

Note

Throttles are synchronized at cruising settings. At take-off settings they are approximately $\frac{1}{2}$ " apart.

b. SUPERCHARGER OPERATION.

These engines are equipped with two-speed superchargers and should be operated in the blower ratios specified on the power plant chart, Section III. High blower ratio should only be used as indicated on the chart to obtain maximum speed and rate of climb. High blower should not be used at cruising altitudes when cruising power is available in low blower, as fuel economy is inferior and there is greater tendency for the engine to detonate.

Do not shift the supercharger control more often than at five minute intervals, except in an emergency, to allow dissipation of heat from the blower clutches. The control must be either fully up or fully down, to prevent clutch slippage and to insure availability of rated power at all times. If practicable, at the end of five hours operation in either blower ratio, shift to the other ratio for five minutes to eliminate sludge accumulation in the clutches.

Although it is possible to make clutch shifts at Military and War Emergency Power, it should not be done except in an emergency; and, in general, clutch shifting should be confined to engine speeds between 1200 r.p.m. and 2400 r.p.m. If "AUTO LEAN" mixture is being used before shifting from "LOW" to "HIGH" it is not necessary to move the mixture control to "AUTO RICH" before making the shift. However, if the engine tends to cut out during a shift while operating in "AUTO LEAN," this tendency will be reduced if the mixture control is moved to "AUTO RICH" before making the shift.

(1) SHIFT FROM "LOW" TO "HIGH".

(a) Move supercharger control to the "HIGH" position. Then immediately retard the throttle to reduce the manifold pressure 3 or 4 in. Hg. before the high ratio clutches can engage.

(b) As soon as the high ratio clutches have engaged and the manifold pressure has stabilized, adjust the propeller control and the throttle control to obtain the desired power.

(2) To change from HIGH to LOW:

(a) Mixture control—AUTO RICH.

(b) Shift control rapidly from HIGH to LOW.

(c) Readjust rpm throttle setting and mixture control to obtain desired power.

c. WATER INJECTION SYSTEM OPERATION.—The system supply provides fluid for approximately five minutes operation therefore it must be conserved for emergency use only.

d. COMBAT POWER (WEP).—The R-2800-34W engine is cleared for combat power operation at 2800 rpm in "LOW" blower in accordance with the following table:

COMBAT POWER RATINGS AT 2800 RPM
"LOW" BLOWER

Std. Alt. Ft.	Man. Press. "hg	Fuel Flow Gal./Min.	Water Flow Gal./Min.
S.L.	66.0	4.9	2.7
2000	61.5	4.7	2.5
4000	57.5	4.3	2.4
6000	54.0	3.9	2.3
8000	50.0	3.6	2.2
10000	46.5	3.3	2.0
12000	43.0	3.1	1.9

NOTE

Size No. 7 water jet gives the desired rates of flow for combat power.

(1) Set water pump switch on lower control panel to ON. This switch starts the A.D.I. pumps to deliver fluid under pressure to the regulators.

(2) Mixture—AUTO RICH.

(3) Propellers—FULL INCREASE R.P.M.

(4) Throttles—FULL FORWARD (last 1/4 inch travel closes switch to operate regulators and admit fluid to blowers).

e. TYPE GR-1 AUTOMATIC PILOT OPERATION.

(1) AFTER TAKE-OFF.—Until thoroughly familiar with its operation, the automatic pilot should not be engaged before a reasonable altitude (2000 feet approximately) has been attained. After complete familiarization, the pilot may be engaged after take-off.

(a) Trim airplane for hands-off level flight.

Note

The automatic pilot, being self-synchronous, will take control and maintain the existing flight attitude at the moment of engagement within its operating limits: Bank—45°, Climb—30°, and Dive—50°. desired angle of bank is obtained (limit—45°).

(f) To climb, pull maneuvering lever aft. Hold lever in position until desired angle of climb is obtained (limit—30°).

(g) To dive, push maneuvering lever forward. Hold lever in position until desired angle of dive is obtained (limit—50°).

(b) To return to level flight automatically, pull ON-OFF control "T" handle to "CENTRALIZED". Hold until level flight or desired recovery angle is attained. The airplane will automatically return to straight and level flight from attitudes within the limits of the gyroscopes of the automatic pilot.

(i) To overpower the automatic pilot, apply approximately twice the normal force on the airplane controls.

(2) PERIODIC FLIGHT CHECK.

(a) Check how closely the flight attitude is held. Check for hunt by inducing transients in the elevator and ailerons.

(b) Hold a selected heading for a minimum of 10 minutes. Check for drift, left or right, maximum $\pm 1^\circ$.

(c) During banks to left and right, rate of roll should be approximately 5° per second. Check for smoothness of roll and rudder coordination.

(d) Check operation in a climb to 100 knots and dive to 280 knots. Check combined climb and bank, and dive and bank.

(e) "CENTRALIZE" from bank, climbing turn and diving turn. Limits after recovery are 800 feet per minute climb or glide.

(f) Overpower manually all controls. Note return to original attitude. Also note any tendency toward oscillation of the controls.

(b) Set the directional gyro card for heading. Engage the pilot by pulling the ON-OFF control "T" handle to "ON". By holding the controls as the pilot is engaged, you will feel when it is flying the airplane.

(c) At the time of application of the "T" handle to "ON", the pilot will take control and maintain the existing flight attitude of the airplane until an attitude change is effected by the controller lever; or until the automatic pilot is overpowered by operating the airplane controls.

(d) To make coordinated turns, push controller lever to the left or right as desired and hold until the desired rate of turn is obtained then release. This automatically disengages the straight course feature. In order to resume a straight course again, momentarily press the controller lever button after the airplane is set on the new course.

(e) To bank without turning, push the controller lever to the left or right while depressing the button. Hold lever and button in position only until

Note

1

At periodic intervals, correct for directional gyro drift in the conventional manner.

2

Keep gyros uncaged at all times except when leveling the bank and climb control or resetting the directional control.

3

Keep the airplane approximately in trim. Check at such times when the airplane is being flown manually.

4

During turns, correct for loss of altitude due to bank and climb gyro turn error by using controller lever.

5

In icing conditions, disengage the pilot frequently and move the controls manually to see that they are free.

6

For corrections in excess of 2°, disengage the directional control by momentarily flicking the controller lever to the side. Rudder to the new heading and then depress directional (lock) button momentarily to maintain new heading.

12. STALLS.

The airplane will shake and mush slowly, losing altitude until the stick is pushed forward—flying speed will be re-attained quickly with the forward movement of the stick. Stalling characteristics are similar in both clean and landing conditions, and, therefore, can be reduced to two classifications, power-on and power-off.

The stalling speeds for the airplane in the landing condition are:

Power OFF—69-70 knots.

Power ON —59-60 knots.

Minimum power for level flight is used in power stalls. Speed is reduced by slowly bringing the nose above the horizon. About 10 knots above the stalling speed the entire airplane begins to tremble with increasing amplitude until the airspeed becomes constant. No clean breakaway is ever felt. The airplane shakes and mushes slowly, losing altitude until the stick is pushed forward. With this movement the stall shake disappears immediately and flying speed is regained.

Power off stalls are approximately the same except the stall breaks clean without either wing "falling off". Flying speed is quickly resumed with forward movement of the stick. Slow speed control is good. Lateral control in a prolonged stall could be maintained with rudder. Elevator forces to stall are fairly high but not uncomfortable. This force immediately lightens with stall recovery. Most stall recoveries could be made with only 300 to 400 feet loss of altitude.

13. SPINS.

INTENTIONAL SPINS ARE PROHIBITED. Refer to paragraph 1b, Section II. To recover from an inadvertent spin (which will be very violent and oscillating):

a. Simultaneously REVERSE RUDDER and NEUTRAL STICK for ½ turn (approx.).

b. Move stick FORWARD. The airplane will not recover until the stick is pushed FORWARD—then it will come out sharply. During recovery the nose will drop 30° (approx.) and the airplane will come out in the direction of rotation of the spin.

CAUTION

DO NOT PULL OUT OF DIVE UNTIL FLYING SPEED IS REGAINED, especially in a heavy loading condition.

14. PERMISSIBLE ACROBATICS.

Only those acrobatics and maneuvers listed in paragraph 1b, Section II are permissible with this airplane. However, before starting any acrobatics or violent maneuvers:

a. Cage—gyro horizon.

b. Cage—directional gyro.

15. DIVING.

a. For ordinary short dives in maneuvers the engine nose sections will not load up nor will the engines cool off to any extent.

(1) Set propellers to 1900-2200 r.p.m.

(2) Close cowl flaps (manual).

(3) Set supercharger—low blower.

(4) Set trim tabs control.

(a) Rudder—0.

(b) Elevator—0.

(c) Aileron—0.

b. For prolonged dives to avoid loading up the engine nose sections or cooling the engines excessively:

(1) Set propeller controls to max. cruising r.p.m. (2250 \pm 100).

(2) Set throttles to 15" Hg. M.P.

(3) Set mixture controls to AUTO RICH. Overcooled engines may be cut out in AUTO LEAN.

c. MAX. DIVING R.P.M. — 3120 FOR 30 SECONDS.

d. In the event that overspeeding beyond the overspeed limit of the engines occurs the following procedure is recommended:

- (1) Throttles to CLOSE.
- (2) Propellers to DECREASE.
- (3) Reduce air speed to minimum speed for safe glide.

CAUTION

When diving from a high altitude, manifold pressure will build up rapidly at a constant throttle setting. At completion of dive, advance throttles very slowly so that partly cooled engine will not cut-out.

e. HIGH SPEED DIVES.—Since it may become difficult for the pilot, during operations, to remember the restricted speed and "g" for the airplane at various altitudes when making high speed dives and consequently making it difficult to fly the airplane to its maximum performance, the following dive characteristics are given:

(1) DIVE ENTRY.—Dives of from 0° to 25° angle can be started from high speed level flight and full power from almost any altitude without running into any aerodynamic or compressibility troubles. Dives of from 25° to 30° at full power extended below 10000 feet might exceed the ultimate restricted speed of the airplane. Therefore, when prolonged dives are extended below 10000 feet, careful engine control should be maintained in order not to exceed the restricted speed of 430 k. at any time.

In dives of over 30° extreme care must be given to the method of entry. Half rolls and half loops may be done in the F7F, starting from an altitude of 20000 feet at approximately 200 k. The half roll and the half loop at this altitude cannot be extended over 1000 or 2000 feet in an absolute vertical dive path before recovery must be made prior to running into compressibility troubles therefore, overhead gunnery approaches from over 20000 feet should be carefully planned in order to execute the entry into a vertical dive from as slow a speed as possible.

WARNING

Steep dive entries from altitudes above 20000 feet should always be started from as slow a speed as possible.

(2) CONTINUED DIVING.—In prolonged dives up to 30°, the dive angle can be maintained by the use of the stick or the elevator tab control. Care should be exercised (in the F7F-1) that the restricted manifold pressure limits of the engine are not exceeded. It is very easy (in the F7F-1) to pick up a large increase in manifold pressure in only a few thousand feet of diving because of the excellent ram effect in this airplane and the fact that manifold pressure regulators have not

been installed on all production airplanes. A similar increase in manifold pressure will occur even though a manifold pressure regulator is installed, if a dive is entered above critical altitude.

In dives of over 30° the airspeed will increase quickly and will place the airplane in the compressibility range in a very short time. The first evidences of the compressibility effects are loss of elevator tab effectiveness and a spongy elevator control feeling until the stick is pulled back far enough to bottom the elevator spring tab. The airplane then tends to nose over into a steeper dive angle and finally the elevator becomes immovable. After the first nose-down tendencies of the airplane are felt, a large pull force on the elevator control will enable the pilot to make his dive path shallower. In cases of very steep dives these first tendencies will give the pilot only a very short time to appreciate the situation, and unless very quick realization is felt for his predicament, the elevator stick forces will be in the frozen condition before the pilot will have time to make use of the first symptoms of compressibility. When the airplane is in the compressibility range and after the elevator control tab has lost its effectiveness, it will be of no avail to use the elevator tab control because after the elevator tab control is set in some other position than the position it was when the compressibility range was entered, excessive loads may be imposed on the airplane when the airplane again comes out of compressibility range.

Note

Do not use the elevator tab for control after the compressibility range has been entered.

(3) DIVE RECOVERY.—Starting from 16000 feet at approximately 100 to 110 k, vertical dives have been made up to 6000 feet in length. Using a constant 5 g acceleration for recovery, the pull-out was begun at 340 k. Before the airplane had approached level flight in the pull-out, the airspeed increased to 410 k IAS. This will serve as an example to show that steep dives must be recovered with a large margin of speed prior to reaching the restricted speed of the airplane.

WARNING

Do not wait until compressibility effects are felt in steep angle dives and especially at high altitudes. If recoveries are withheld until the compressibility effects are felt, there will be insufficient control for proper recovery.

If all of the symptoms mentioned are carefully considered and the pilot is careful to look-out for such effects during the early part of his training, no difficulty should be experienced in flying this airplane to its maximum performance.

16. NIGHT FLYING.

- a. Wear red goggles for ½ hour before each flight.
- b. Avoid all light (searchlights, flares, etc.) as much as possible, except red light.

c. Do not look at lighted instruments longer than necessary even though light is red.

d. Practice "blindfold drills" until all controls can be operated with ease in the dark.

e. Scan the sky systematically, moving the eyes over small areas at a time. Do not stare. Learn to look for night targets out of the corners of the eyes.

f. Use oxygen for all night flights.

g. Learn to look for and identify objects solely by contrast (light and shadow).

17. APPROACH AND LANDING.

a. Check-off list:

(1) TANK SELECTOR—Best tank.

(2) FUEL BOOST PUMP—ON.

(3) MIXTURE—AUTO-RICH.

(4) SUPERCHARGER—low blower.

(5) CARBURETOR AIR — NORMAL or as needed.

(6) PROPELLERS — 2400 r.p.m. (on the approach).

Note

If more power is necessary, in landing, move throttle slowly and smoothly, to prevent over-speeding of the engine.

(7) Reduce speed below 120 knots and lower landing gear.

(8) ARRESTING HOOK — DOWN (if carrier landing).

(9) Depress brake pedals and check hydraulic pressure.

(10) ARMAMENT MASTER SWITCH—OFF.

(11) LANDING GEAR—DOWN.

(12) FLAPS CONTROL—DOWN.



**SAFETY YOUR GUNS
BEFORE COMING IN**

CAUTION

Do not operate flaps at—

15° in excess of 225 knots I.A.S.

30° in excess of 150 knots I.A.S.

40° in excess of 130 knots I.A.S.

Reasonable control may be maintained with any one flap not synchronized. The loss of hydraulic pressure cannot cause flaps to become unsynchronized.

(13) Check positions on landing gear and flap indicator and check visually main wheels and nose wheel (mirror on L.H. nacelle).

(14) COCKPIT HOOD—locked open.

(15) Refer to Appendix I, Take-off, Climb and Landing Chart, for landing run distances.

b. NORMAL LANDING PROCEDURE.

(1) The feeling of controllability during the approach may be deceiving to pilots accustomed to airplanes not equipped with spring controls. Stick forces are light and effective. There is no change in trim with extension of the landing gear only—extension of the landing gear and flaps makes the airplane slightly nose heavy.

(2) The position of the cowl flaps and oil cooler exit duct doors affects neither landing speed, trim or feel, and landings can be made with these flaps closed—OPEN FLAPS IMMEDIATELY UPON LANDING.

(3) For best approach and landing, with the landing gear and flaps extended, with 15-20" Hg. M.P. approximately and at about 100 knots, close the throttle at approximately 100 ft. altitude, before reaching the end of the runway—this will give the airplane considerable float after leveling off.

(4) Minimum approach speed, with landing gear and flaps extended, is 87 knots approximately. Stick forces in leveling off are fairly light and controllability is good. As soon as the airplane is leveled out above the runway, the elevator stick forces increase considerably.

(5) With the C.G. normal (at about 24.5% M.A.C.) a landing can be made easily with one hand, but when the C.G. is 22.5-23% M.A.C., stick forces become critical for one handed landing.

(6) The best procedure for normal landings is to hold the nose wheel off until the main wheels contact, then let the nose wheel touch the runway of its own accord and apply the brakes. When the airplane is rolling on the main wheels, excellent control can be maintained with rudder alone, until the nose wheel touches; then either the brakes or engines may be used for directional control.

(7) A carrier wave-off can be made with this airplane with little difficulty. There is little torque effect from power even with full tail heavy tab; the stick forces are not excessive when full power is applied.

(8) Apply brakes evenly; if brakes are applied



LAND ON MAIN WHEELS FIRST - HOLD NOSE WHEEL OFF

with the nose wheel off the ground, undue bouncing of the nose wheel may occur. On slippery runways, for more effective braking, hold the nose wheel off and apply up elevator; more load will be put upon the main wheels, off-setting the pitching movement as the brakes are applied. If one brake should lock, due to uneven pressure application, or uneven surface friction on a slippery runway, the airplane will swing toward the locked wheel. Release the brakes, and re-apply evenly.

c. CROSS WIND LANDING.—The airplane may be landed in 90° cross winds up to 30 MPH with no difficulty. As long as the flight path is concurrent with the runway, the airplane will turn itself into a straight path along the runway upon contact without the necessity of the pilot kicking the airplane straight before touching. To overcome cross winds in taxiing reduce power on the lee engine.

d. TAKE-OFF IF LANDING IS NOT COMPLETED:

- (1) Open both throttles slowly and smoothly.
- (2) Move governor controls to full INCREASE R.P.M. if propellers were not previously set to 2800 r.p.m.
- (3) Raise landing gear.
- (4) Raise flaps after minimum safe altitude has been attained.
- (5) Reduce power.

e. AT COMPLETION OF LANDING:

- (1) FLAPS—UP.
- (2) COWL FLAPS—OPEN (manual).
- (3) OIL COOLER EXIT DUCT DOORS—OPEN (manual).
- (4) ELECTRIC BOOSTER FUEL PUMP—OFF.
- (5) Taxi clear of runway. Avoid taxiing through tall grass, mud, etc., to avoid damage to nose wheel or propellers.

18. STOPPING ENGINES.

- a. PROPELLERS*—Full "INCREASE RPM" position.
- b. SUPERCHARGER CONTROL*—Run each engine at 1200 to 1400 rpm and make several shifts through HIGH and LOW remaining in each position for about 30 seconds. Reduce speed to 1000 rpm.
- c. MIXTURE CONTROLS*—IDLE CUT-OFF.
- d. IGNITION SWITCH (BOTH)*—OFF (when engine stops).
- e. BATTERY SWITCH*—OFF.
- f. RADIO CONTROLS AND SWITCHES*—OFF.
- g. ENG. or FUEL SELECTOR*—OFF.
- h. TANK SELECTOR VALVE*—OFF.
- i. OIL DILUTION PROCEDURE*—If cold weather starting temperature below -5°C (-23°F)—is anticipated the oil dilution system should be operated as follows:

Note

Applicable only if oil dilution parts have been installed.

- (1) OIL DILUTION SHUT-OFF COCK—open.
- (2) ENGINE SPEED—1000 r.p.m.
- (3) OIL DILUTION SWITCH—ON for two minutes approximately.

Note

When the solenoid valve is opened by the switch action, there will be a sharp drop in indicated fuel pressure. Fuel pressure should return to normal immediately after closing the valve. If not, stop the engine at once and check for valve leakage.

- (4) MIXTURE CONTROL—IDLE CUT-OFF (after two minutes—to stop engine).

(5) IGNITION SWITCH—OFF.

(6) OIL DILUTION SWITCH—OFF (after engine stops turning). If the oil pressure of a cold engine, started after oil dilution, fluctuates or drops, after running a short time, the oil dilution switch should be moved to ON, for intervals of a few seconds each, for about fifteen seconds. If oil pressure still does not steady out, stop the engine and wait five minutes before attempting another start.

19. BEFORE LEAVING THE PILOT'S COCKPIT.

- a. ARMAMENT SWITCHES—OFF.
- b. IGNITION SWITCH—OFF.
- c. RADIO SWITCHES—OFF.
- d. TANK SELECTOR VALVE—OFF.

e. ENG. or FUEL SELECTOR—OFF.

f. COWL FLAPS—OPEN.

g. OIL COOLER EXIT DUCT DOORS—CLOSED (if cool).

h. WING FLAPS—UP.

i. WINGS.—Folded, jury struts in place—or spread, if desired.

j. FLYING CONTROLS.—Controls lock in place.

k. MAIN BATTERY SWITCH—OFF.

l. GENERATOR SWITCHES—OFF.

m. COCKPIT HOOD(S)—CLOSED.

20. MOORING.

Mooring rings are provided on the bottoms of the main landing gear struts, at the axles.





**SECTION III
OPERATING DATA**

AIRSPEED INSTALLATION CORRECTION TABLE		
I.A.S. (KNOTS)		CORRECTION
FLAPS DOWN		
100	Add	7.0
110	Add	2.5
120	Deduct	1.5
130	Deduct	3.5
135	Deduct	2.0
FLAPS UP		
100	Add	11.0
120	Add	9.0
140	Add	7.0
160	Add	5.0
180	Add	3.0
200	—	0
220	Deduct	1.0
240	Deduct	3.5
270	Deduct	6.5
300	Deduct	9.5
350	Deduct	14.5
400	Deduct	20.0
430	Deduct	24.0

Figure 36—Airspeed Installation Correction Table

ENGINE MODEL(S)
R2800-22W

GAUGE READING	FUEL PRESS.	OIL PRESS.	OIL TEMP.	COOLANT TEMP.		OIL ^{VI} CONS.
DESIRED	22	75-95	60-85			
MAXIMUM	23	100	95			
MINIMUM IDLING	21 18	60 25	40(8)			

MAXIMUM PERMISSABLE DIVING RPM: 3120
 MINIMUM RECOMMENDED CRUISE RPM:
 MAXIMUM RECOMMENDED TURBO RPM:
 OIL GRADE: (S) 1100 (M) Spec. AN-O-8
 FUEL GRADE: 115/145 Spec. AN-F-48

WAR EMERGENCY (9)(COMBAT EMERGENCY)			MILITARY POWER (NON-COMBAT EMERGENCY)			OPERATING CONDITION			NORMAL RATED (MAXIMUM CONTINUOUS)			MAXIMUM CRUISE (NORMAL OPERATION)		
FIVE MINUTES 260°C			FIVE MINUTES 260°C			TIME LIMIT MAX. CYL. HD. TEMP.			ONE HOUR UNLIMITED 260°C 232°C			UNLIMITED 232°C		
AUTO RICH 2000			AUTO RICH 2800			MIXTURE R. P. M.			AUTO LEAN (4) 2600			AUTO LEAN 2200		
MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽¹²⁾ Gal/Nin	MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽¹²⁾ Gal/Nin	STD. TEMP. °C	PRESSURE ALTITUDE	STD. TEMP. °F	MANIF. PRESS.	SUPER- CHARGER	FUEL GPH ⁽¹³⁾	MANIF. PRESS.	SUPER- CHARGER	FUEL GPH ⁽¹³⁾
						-55.0 -55.0 -55.0	40,000 FT. 38,000 FT. 36,000 FT.	-67.0 -67.0 -67.0						
			F.T.	High	1.5	-52.4 -48.4 -44.4	34,000 FT. 32,000 FT. 30,000 FT.	-62.3 -55.1 -48.0	F.T.	High	81	F.T.	High	55
			F.T. F.T. F.T.	High High High	1.6 1.9 2.2	-40.5 -36.5 -32.5	28,000 FT. 26,000 FT. 24,000 FT.	-40.9 -33.7 -26.5	F.T. F.T. F.T.	High High High	85 92 104	F.T. F.T. F.T.	High High High	59 63 68
			F.T. F.T. F.T.	High High High	2.4 2.7 3.1	-28.6 -24.6 -20.7	22,000 FT. 20,000 FT. 18,000 FT.	-19.4 -12.3 -5.2	F.T. F.T. 41.5	High High High	110 139 155	F.T. F.T. F.T.	High High High	73 78 82
F.T.	Low	3.1	48.5 48.5 48.5	High High High	3.7 3.7 3.7	-16.7 -12.7 -8.8	16,000 FT. 14,000 FT. 12,000 FT.	2.0 9.1 16.2	41.5 41.5 F.T.	High High Low	154 156 145	33 33 F.T. (7)	High High Low	84 83 82
F.T. F.T. F.T.	Low Low Low	3.4 3.6 3.9	(5) F.T. F.T. F.T.	Low Low Low	3.5 3.9 4.2	-4.8 -0.8 3.1	10,000 FT. 8,000 FT. 6,000 FT.	23.4 30.6 37.6	(6) F.T. 41 41	Low Low Low	160 172 170	32 32 32	Low Low Low	89 87 85
F.T. F.T. F.T.	Low Low Low	4.2 4.5 4.8	F.T. F.T. 58	Low Low Low	4.5 4.9 5.0	7.1 11.0 15.0	4,000 FT. 2,000 FT. SEA LEVEL	44.7 51.8 59.0	41 41 41	Low Low Low	162 160 159	32 32 32	Low Low Low	83 78 70

FOR COMPLETE CRUISING DATA SEE APPENDIX 11
NOTE: TO DETERMINE CONSUMPTION IN BRITISH
IMPERIAL UNITS, MULTIPLY BY 10 THEN DIVIDE
BY 12.

TAKE-OFF CONDITIONS: 2800 RPM 58.0" MP
Low Blower Auto Rich
Cyl. Hd. Temp. 260° Max.

SPECIAL NOTES

- (4) Use Auto Rich for all operation above 2600 RPM. Use Auto Lean for flight operation at 2600 RPM and below, provided cylinder head temperature limits are not exceeded.
 - (5) Shift to High Blower when MP drops to 40°.
 - (6) Shift to High Blower when MP drops to 35°.
 - (7) Shift to High Blower when MP drops to 29.5°.
- Blower-Shift Altitudes are approximate and vary with carburetor entrance conditions.
- (8) Minimum oil temperature for normal Take-Off.
 - (9) A No. 7 water jet gives desired rates of flow for combat power.

POWER PLANT CHART

AIRCRAFT MODEL(S)

F7F

PROPELLER(S)

Hamilton-Standard
Hydromatic Full-Feathering

ENGINE MODEL(S)

R-2800-34W

GAUGE READING	FUEL PRESS.	OIL PRESS.	OIL TEMP.	COOLANT TEMP.		OIL ⁽¹⁾ CONS.
DESIRED	22	75-95	80-85			
MAXIMUM	23	100	95			
MINIMUM IDLING	21 18	60 25	40(8)			

MAXIMUM PERMISSABLE DIVING RPM: 3120
 MINIMUM RECOMMENDED CRUISE RPM:
 MAXIMUM RECOMMENDED TURBO RPM:
 OIL GRADE: (S) 1100 (W) Spec. AN-O-8
 FUEL GRADE: 115/145 Spec. AN-F-48

WAR EMERGENCY (9)(COMBAT EMERGENCY)			MILITARY POWER (NON-COMBAT EMERGENCY)			OPERATING CONDITION			NORMAL RATED (MAXIMUM CONTINUOUS)			MAXIMUM CRUISE (NORMAL OPERATION)		
FIVE MINUTES 260°C			FIVE MINUTES 260°C			TIME LIMIT MAX. CYL. HD. TEMP.			ONE HOUR UNLIMITED 260°C 232°C			UNLIMITED 232°C		
AUTO RICH 2800			AUTO RICH 2300			MIXTURE R. P. H.			AUTO LEAN 2600			AUTO LEAN 2200		
MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽²⁾ Gal/Min	MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽²⁾ Gal/Min	STD. TEMP. °C	PRESSURE ALTITUDE	STD. TEMP. °F	MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽²⁾ GPH ⁽³⁾	MANIF. PRESS.	SUPER- CHARGER	FUEL ⁽³⁾ GPH ⁽³⁾
						-55.0 -55.0 -55.0	40,000 FT. 38,000 FT. 36,000 FT.	-67.0 -67.0 -67.0						
			F.T.	High	1.9	-52.4 -48.4 -44.4	34,000 FT. 32,000 FT. 30,000 FT.	-62.3 -55.1 -48.0	F.T.	High	82	F.T.	High	57
			F.T.	High	2.2	-40.5	28,000 FT.	-40.9	F.T.	High	85	F.T.	High	61
			F.T.	High	2.5	-36.5	26,000 FT.	-33.7	F.T.	High	95	F.T.	High	66
			F.T.	High	2.8	-32.5	24,000 FT.	-26.5	F.T.	High	115	F.T.	High	70
			F.T.	High	3.1	-28.6	22,000 FT.	-19.4	F.T.	High	134	F.T.	High	76
			F.T.	High	3.5	-24.6	20,000 FT.	-12.3	F.T.	High	149	F.T.	High	81
			F.T.	High	3.8	-20.7	18,000 FT.	-5.2	F.T.	High	159	33	High	88
F.T.	Low	3.1	49.5	High	4.0	-16.7	16,000 FT.	2.0	42	High	158	33	High	84
			49.5	High	4.0	-12.7	14,000 FT.	9.1	42	High	157	33	High	83
			49.5	High	3.9	-8.8	12,000 FT.	16.2	(6) F.T.	Low	145	(7) F.T.	Low	82
F.T.	Low	3.4	(5) F.T.	Low	3.5	-4.8	10,000 FT.	23.4	F.T.	Low	160	32	Low	89
F.T.	Low	3.6	F.T.	Low	3.9	-0.8	8,000 FT.	30.5	41	Low	172	32	Low	87
F.T.	Low	3.9	F.T.	Low	4.2	3.1	6,000 FT.	37.6	41	Low	170	32	Low	85
F.T.	Low	4.2	F.T.	Low	4.5	7.1	4,000 FT.	44.7	41	Low	162	32	Low	83
F.T.	Low	4.5	F.T.	Low	4.9	11.0	2,000 FT.	51.8	41	Low	160	32	Low	78
F.T.	Low	4.8	58	Low	5.0	15.0	SEA LEVEL	59.0	41	Low	159	32	Low	70

GENERAL NOTES

(1) OIL CONSUMPTION: MAXIMUM U.S. QUART PER HOUR PER ENGINE.

(2) Gal/MIN: APPROXIMATE U.S. GALLON PER MINUTE PER ENGINE

(3) GPH: APPROXIMATE U.S. GALLON PER HOUR PER ENGINE.

F.T.: MEANS FULL THROTTLE OPERATION.

VALUES ARE FOR LEVEL FLIGHT WITH RAM.

FOR COMPLETE CRUISING DATA SEE APPENDIX II

NOTE: TO DETERMINE CONSUMPTION IN BRITISH
IMPERIAL UNITS, MULTIPLY BY 10 THEN DIVIDE
BY 12.

TAKE-OFF CONDITIONS: 2800 RPM 58.0" MP
 Low Blower Auto Rich
 Cyl. Hd. Temp. 260°C Max.

CONDITIONS TO AVOID:**SPECIAL NOTES**

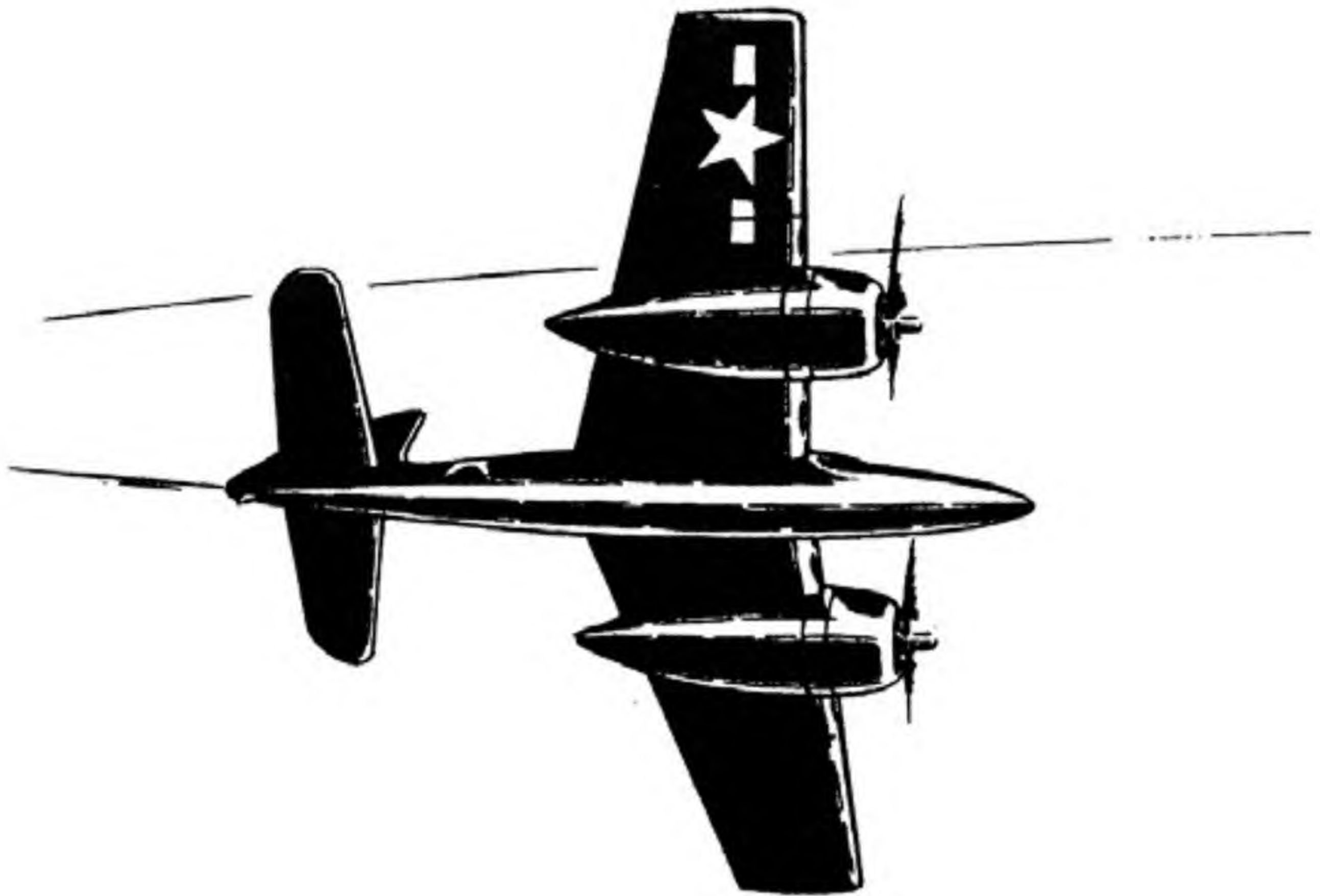
- (4) Use Auto Rich for all operation above 2000 RPM. Use Auto Lean for flight operation at 2600 RPM and below, provided cylinder head temperature limits are not exceeded.
- (5) Shift to High Blower when manifold pressure drops to 41".
- (6) Shift to High Blower when manifold pressure drops to 36".
- (7) Shift to High Blower when manifold pressure drops to 30".
- Blower-Shift Altitudes are approximate and vary with carburetor entrance conditions.
- (8) Minimum oil temperature for Normal Take-Off.
- (9) A No. 7 water jet gives desired rates of flow for combat power.

DATA AS OF 3-15-49 BASED ON AEL CALIB.

ANP-126
8-1-49

Figure 37 (Sheet 2 of 2 Sheets)--Power Plant Chart

RESTRICTED





SECTION IV EMERGENCY OPERATING INSTRUCTIONS

1. FIRE.

- a.* Feather propeller.
- b.* Close throttle simultaneously with (*a*) above.
- c.* Shut off fuel (operate selector valve to cut off engine afire).
- d.* Open engine cowl flaps.
- e.* Open oil cooler exit doors.
- f.* Move mixture control to IDLE CUT-OFF.
- g.* Turn off ignition.
- h.* Turn off electrical switches.
- i.* Do not restart engine.

2. ENGINE FAILURE.

- a.* On take-off before leaving ground (one or both engines).

- (1) Close throttles.
- (2) Apply brakes.

- b.* On take-off after leaving ground but before reaching 120 knots I.A.S. (Necessary for control) (one or both engines).

- (1) Close throttles.
- (2) Land straight ahead.
- (3) Retract gear if landing must be made beyond field limits, on rough or soft ground or in water.

- c.* In flight after 120 knots I.A.S. has been reached.

(1) ONE ENGINE.

- (*a*) Nose down to pick-up flying speed.
- (*b*) Full feather propeller of dead engine.
- (*c*) Rudder into running engine.
- (*d*) Drop wing slightly below horizontal on side toward running engine.
- (*e*) Close throttle of dead engine.
- (*f*) Dead engine mixture—IDLE CUT-OFF.
- (*g*) Ignition switch dead engine—OFF.
- (*h*) Check that landing gear is UP or coming up.

- (*i*) Set rudder to hold straight course.
- (*j*) Set trim tabs as required.
- (*k*) Save good engine by using only necessary power to maintain safe altitude.

- (*l*) Single engine operation—refer to Appendix 1, Flight Operation Instruction Chart.

(2) BOTH ENGINES.

- (*a*) Nose down to pick up flying speed.
- (*b*) Full feather both propellers.
- (*c*) Check tank selector valve and fuel quantity gage—failure may be due to empty tank.
- (*d*) If fuel is OK—set mixture at AUTO-RICH.
- (*e*) Check both magnetos (each engine) individually.

- d.* To restart engine(s) during flight.

- (1) Set dead engine controls as follows:

- (*a*) Check engine or fuel selector valve control for proper setting.
- (*b*) Throttle—CLOSED.
- (*c*) Propeller—decrease r.p.m.
- (*d*) Mixture—IDLE CUT-OFF.
- (*e*) Ignition—ON.
- (*f*) Propeller feathering control—hold IN to unfeather and until r.p.m. reaches 1200 (or propeller will feather again) when governor will take over.
- (*g*) Move mixture control to AUTO-RICH.
- (*h*) Warm up engine and increase power as required.

CAUTION

The engine must not be run on full power until oil pressure is normal and temperature reaches 50°C (122°F).

3. FORCED LANDINGS.

a. ON GROUND.

- (1) Maintain flying speed.
- (2) Jettison droppable tanks or bombs (safed).
- (3) If landing must be made on soft or rough ground retract landing gear.

If a wheels down landing is to be made use emergency air system ("T" handles — air bottles) to lower gear. Refer to paragraph 4, this section.

- (4) Flaps—DOWN.
- (5) Lock shoulder harness.
- (6) Advise radar operator.

- (7) Release cockpit hood(s).
- (8) Make landing well above stalling speed into the wind.
- (9) Immediately before contact—
 - (a) Battery, generator, ignition switches—OFF.
 - (b) Eng. or fuel selector valves—"OFF".
- b. ON WATER.—The procedure for an emergency landing on water is essentially the same as that for on land except that the landing gear must always be UP.
 - (1) Smooth sea—land into the wind.
 - (2) Rough sea—land along trough of swell—across wind if necessary.

4. EMERGENCY LANDING GEAR OPERATION.

If the wheels fail to come down when the control lever is operated (using either engine driven or hand pump hydraulic pressure);—

- a. Move square knob control lever to DOWN.
- b. Pull DOWN and LOCK red "T" handles on lower instrument and control panel. To LOWER and LOCK wheels DOWN, handles may be operated independently (either or both). DO NOT OPERATE "T" HANDLES ABOVE 100-110 KNOTS I.A.S.

Main wheels control is outboard (to right).

Nose wheel control is inboard (to left)

Note

If handles are not LOCKED in the DOWN position the gear may not lock DOWN. Check visually and on L.G. indicator to see if wheels are DOWN and LOCKED.

These "T" handles control the valves on two (one for the main wheels, one for the nose wheel) compressed air bottles installed in the nose of the



SLOW DOWN FOR WHEELS DOWN

fuselage. There is no specific order in pulling the "T" handles for the emergency landing gear dump but because of the excellent control when landing on the main wheels alone it would seem advisable to extend the main wheels first and then nose wheel. The landing gear bottle gages are located on the left hand side of the nose wheel well. 1600-1900 lbs. pressure should show on the gages for proper operation.

CAUTION

Emergency system will only lower wheels once, therefore, use only if certain the hydraulic system will not function. Do not attempt to lower wheels with emergency dump bottles above 100-110 knots I.A.S. At higher speeds wheels will not extend completely, leakage might dissipate enough air to prevent full extension; therefore, fly at lowest possible speed until certain all wheels are down and locked. Once down, locks will hold wheels safely in down position, regardless of air or hydraulic pressure. Be sure handles are locked in down position—air will be lost if handles are allowed to return to up position.

On ground test, to restore the system to normal hydraulic operation, pressure may be relieved, and the gear made free for normal operation, by returning the emergency handles to the normal position. After returning the handles to the normal position, allow sufficient time for all the air to escape before retracting the landing gear.



Figure 38—Landing Gear Emergency Dump Control and Brake Air Gage

5. EMERGENCY BRAKE SYSTEM OPERATION.

- a. If brakes do not hold—pull and hold red "T" handle on left side of cockpit until airplane stops.

An emergency air bottle, similar to those for the landing gear is installed in the nose section of the fuselage for the brakes. After using this air system the brakes can only be released by bleeding the system at the fitting adjacent to the pressure gage located on the lower instrument panel. 1800 p.s.i. pressure should show on the gage for proper braking operation.

6. EMERGENCY ESCAPE FROM AIRPLANE.

a. PILOT'S COCKPIT.

(1) Pull aft red levers at forward corners of hood simultaneously to prevent jamming.

(2) Push both edges of hood outboard to free studs at four corners from carriage fittings.

(3) Push hood up into air stream, which will carry it away.

b. RADAR OPERATOR'S COCKPIT.

(1) Push outboard and forward handle below rail on left side—and simultaneously pull inboard and aft control handle on right side rail.

(2) Push hood up into airstream.

7. EMERGENCY OPERATION OF ELECTRICAL SYSTEM.

If voltmeter readings exceed 28.5 volts a faulty voltage regulator is indicated. To prevent burning out the battery and other equipment determine which regulator is faulty as follows:

- a. Set one generator switch to OFF; if its voltmeter reads high and the other reads normal—leave high reading generator switch OFF.



- b. Repeat the operation with the other generator.

- c. Operate only essential circuits to avoid overloading the remaining generator and the battery.

8. EMERGENCY OPERATION OF HYDRAULIC SYSTEM.

If there is insufficient hydraulic pressure to operate any of the various systems due to line failure, malfunctioning of the engine driven pumps, or engine failure, the hand pump (located on floor to right of seat) may be used to supply pressure to the respective systems as follows:

a. LANDING GEAR.

(1) Move landing gear control lever—UP or DOWN as desired.

(2) Move hand pump selector valve control (on hydraulic panel on right side of cockpit) to **LANDING GEAR ONLY**.

(3) Operate hand pump through:

184 cycles (double strokes) to **RAISE WHEELS**.

268 cycles (double strokes) to **LOWER WHEELS**.

CAUTION

The landing gear will not lock down at speeds above 120 knots.

b. WING FLAPS.

(1) Set flap control lever as desired—15° or 30° Down.

Note

The flap selector valve is shut off in these positions only—positive hydraulic lock is created. In **FULL DOWN (40°)** position valve remains open and air load on flaps will cause bleeding of pressure allowing flaps to come up.

(2) Move hand pump selector valve to **FLAPS ONLY**.



Figure 39—Emergency Brake Control

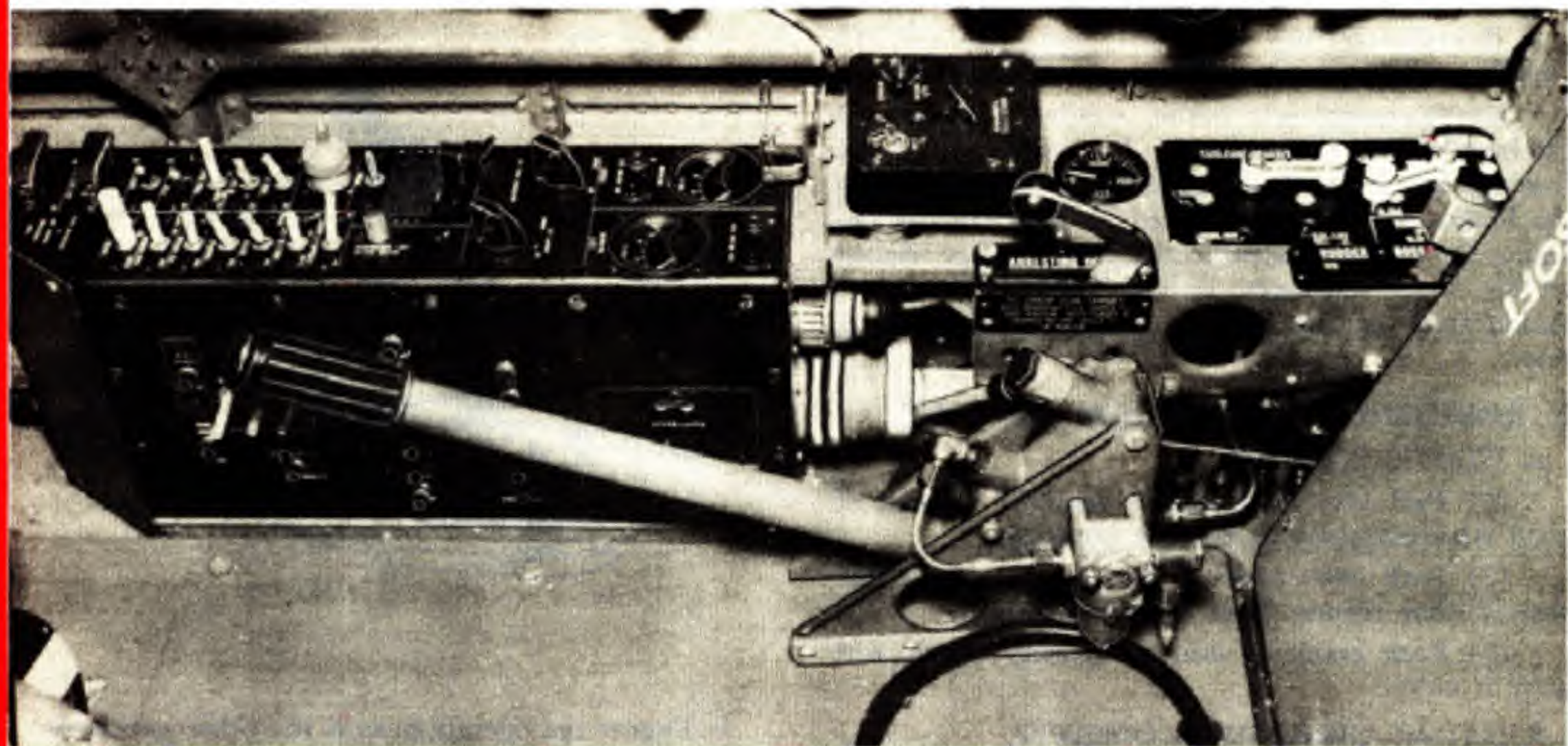


Figure 40—Hydraulic Hand Pump and Panel

(3) Operate hand pump through:

21 cycles (double strokes) to LOWER FLAPS.

15 cycles (double strokes) to RAISE FLAPS.

Refer to Section II, paragraph 1, for speed limitations relative to flap operation.

Note

The flaps are held down only by hydraulic pressure remaining constant—there is no mechanical lock. Therefore, in an emergency when loss of pressure or leaks in the system are indicated it is recommended that the landing gear be lowered before the flaps; if the flaps are lowered first, except to the 15° or 30° DOWN position the force of the air stream may cause a bleeding of pressure and spilling of fluid and there may not be sufficient fluid to lower the landing gear and then the flaps again.

c. BRAKE SYSTEM.—Brakes may be operated by hand pump pressure by setting the hand pump selector valve on SYSTEM and operating the pump and brake pedals. However, a special brake accumulator provides sufficient fluid and pressure for a normal landing with a reasonable run and taxiing. Refer to Section I, paragraph 6e.

d. GUN CHARGING.—Refer to Section V, paragraph 1a.

e. ARRESTING HOOK.—No hydraulic pressure is required to lower the hook. When the control is moved to DOWN a lock is released and the hook drops by gravity and the initial force of the dashpots. To raise the hook:

(1) Move arresting hook control (right side of cockpit) to UP.

(2) Move hand pump selector valve to WING FOLD.—GUNS—ARREST. HOOK.

(3) Operate the hand pump cycles, (double strokes) to raise hook.

f. WING FOLDING AND SPREADING.

(1) To fold the outer panels:

(a) Pull UP handle to UNLOCK the safety locks.

(b) Move wing folding control handle (aft of hand pump selector valve handle) inboard TO FOLD.

(c) Move hand pump selector valve handle to WING FOLD.—GUNS—ARREST. HOOK.

(d) Operate hand pump 146 cycles, (double strokes) to fold wings.

(2) To spread the outer panels:

(a) Move wing folding control handle outboard to SPREAD.

(b) Move hand pump selector valve handle to WING FOLD.—GUNS—ARREST. HOOK.

(c) Operate hand pump 128 cycles, (double strokes) to spread the wings.

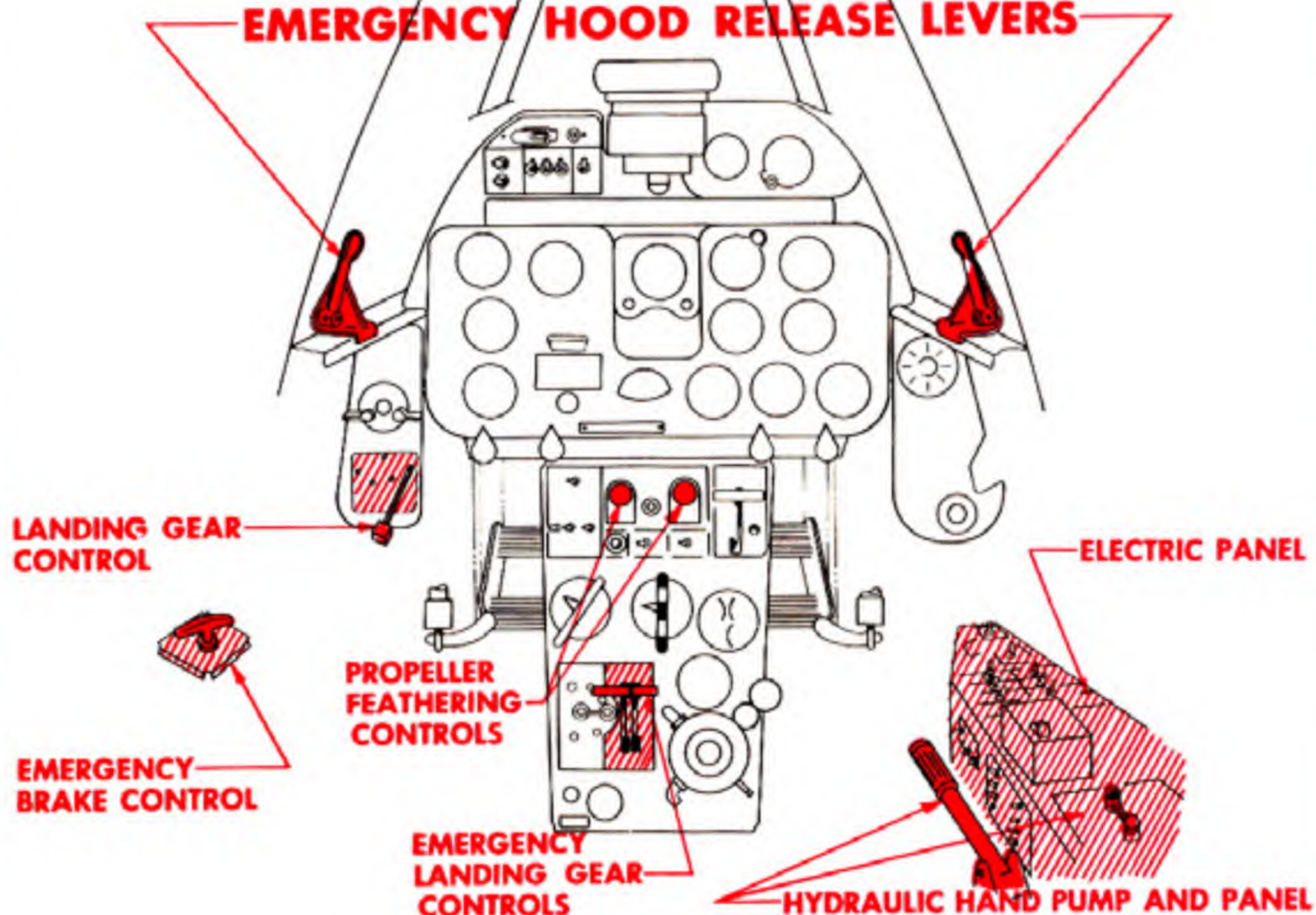
(d) Push DOWN the handle to LOCK the safety locks.

(e) Check position of red indicator flags.

g. RUDDER BOOSTER BY-PASS.—In the event of lack of pressure or line failure in the rudder booster system, a hydraulic block will result. Since hand pump operation of this system is impractical, the only

PILOT'S COCKPIT

EMERGENCY HOOD RELEASE LEVERS



SECOND COCKPIT

(RADAR OPERATOR'S)

EMERGENCY HOOD RELEASE LEVERS

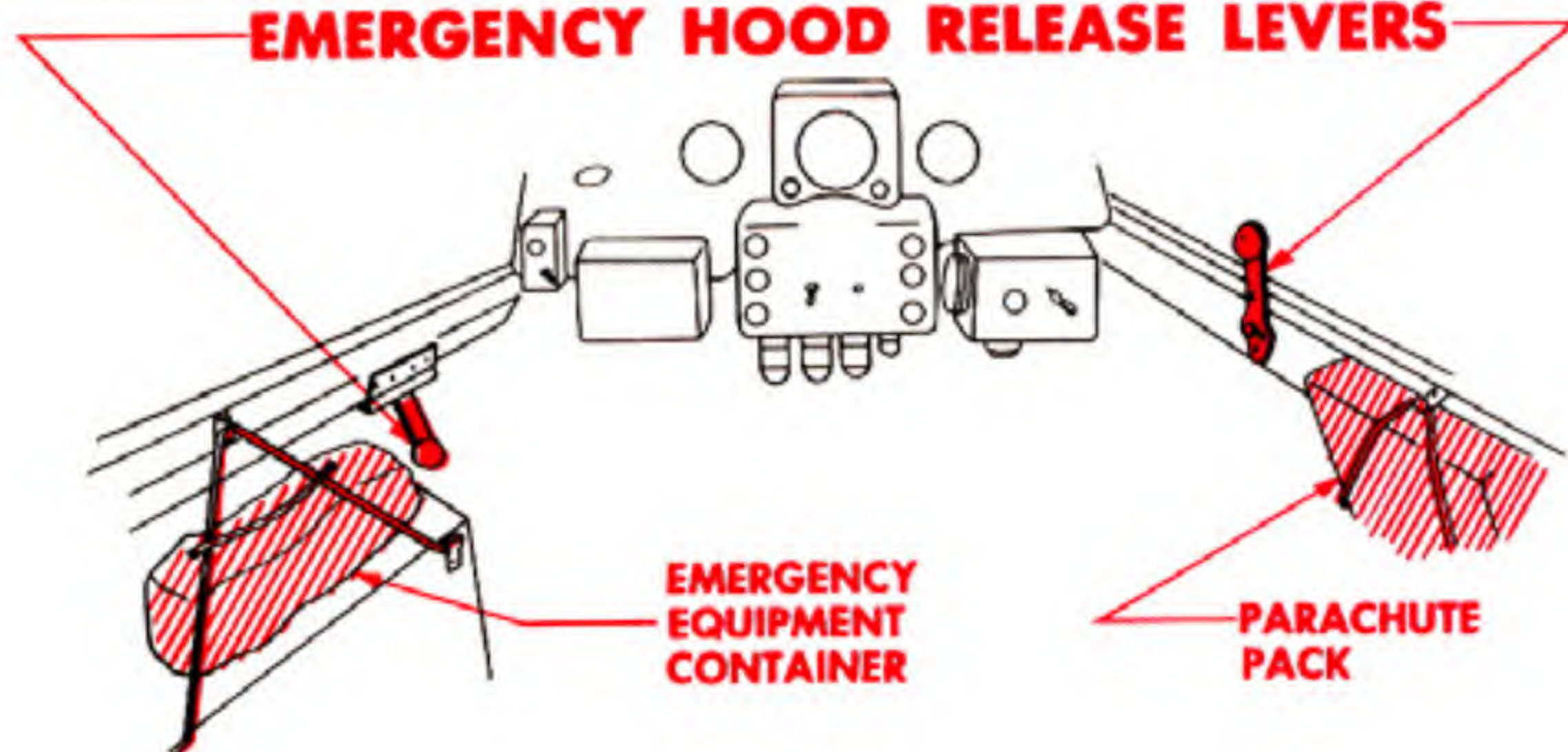


Figure 41—Emergency Controls

emergency operation is to by-pass pressure and break the hydraulic block. Refer to paragraph 10b, this section.

9. EMERGENCY OPERATION OF FUEL SYSTEM.

a. Airplanes Ser. No. 80259-80607 incl.

(1) If fuel pressure falls off below 12 ± 1 psi (warning light glows when pressure drops below 17 ± 1 psi):

(a) Check that fuel booster pump is "ON".

(b) Check fuel gage for quantity in tank in use.

(c) Switch to another tank if gage indicates near empty.

(2) If one engine is not operating set engine selector valve to the other engine ONLY—to cut off fuel from the inoperative engine.

(3) In the event of damage to any internal tank, pull "T" handle to relieve tank pressurizing.

b. Airplanes Ser. No. 80608 and subsequent.

(1) If transfer warning light glows—switch to another tank.

(2) If 30 minute cruise warning light glows—set engine controls for best economy.

(3) If one engine is not operating, set fuel selector valve for that engine to "OFF".

(4) In event of damage to any internal tank, pull "T" handle to relieve tank pressurizing.

10. EMERGENCY OPERATION OF CONTROLS.

a. If flight controls are damaged, use trim tabs and endeavor to maintain normal control.

b. If damage to hydraulic system causes rudder booster to jam due to hydraulic block, move rudder booster by-pass control (square knob mounted on hydraulic hand pump panel on right side of cockpit) aft and lock to "OFF". (Rudder control will become direct by cables from pedals.)

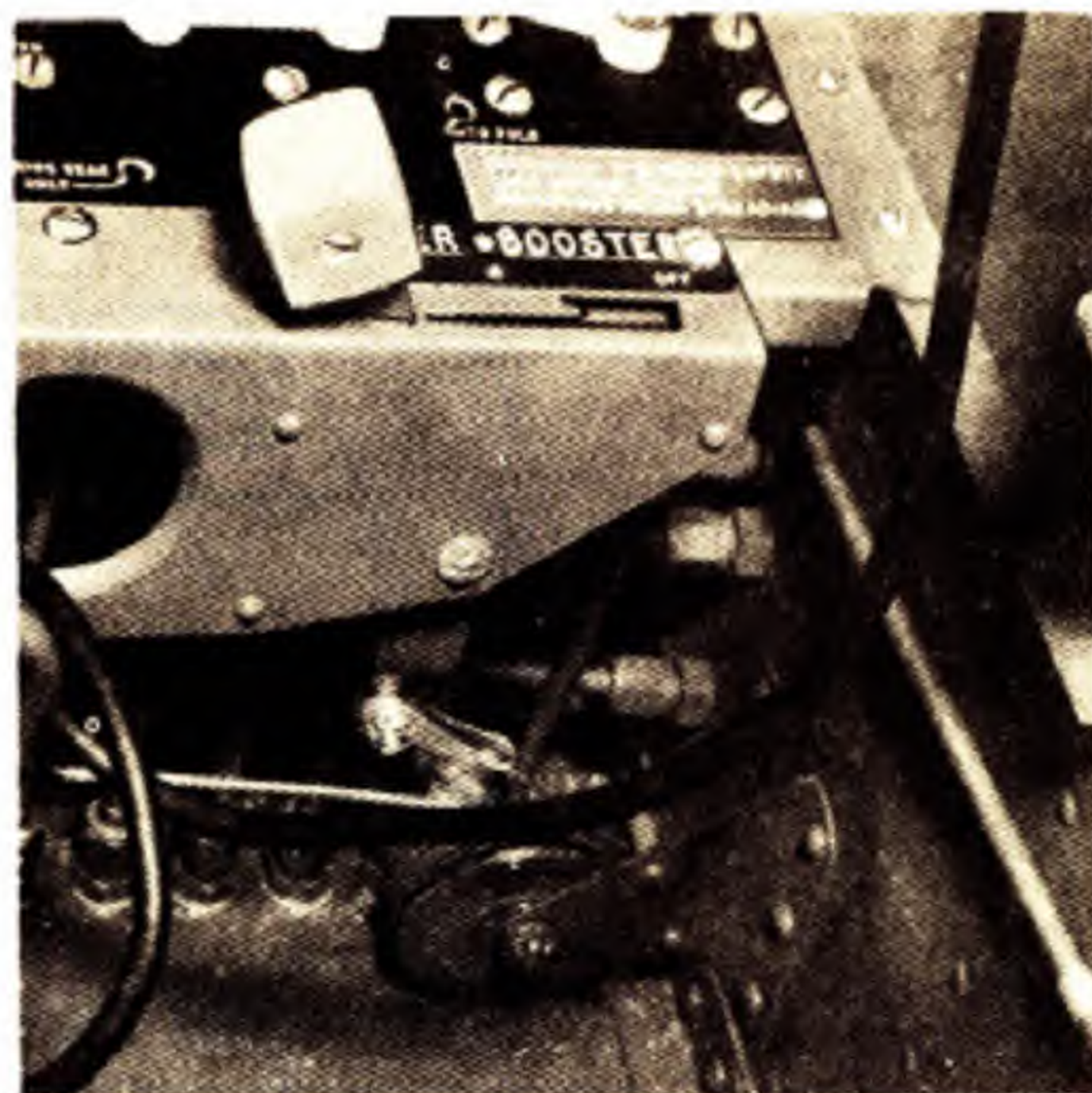


Figure 42—Rudder Booster By-Pass Control

11. EMERGENCY OPERATION OF IFF EQUIPMENT.

a. TO SHOW DISTRESS.—Rotate CODE control to full clockwise position lifting safety latch labeled "PUSH" so that control may be advanced and set on "EMERGENCY" position.

b. TO DESTROY RECEIVER-TRANSMITTER.—Raise red guard labeled "DESTRUCT" breaking safety wire and move switch handle to position "ON" (forward).



SECTION V OPERATIONAL EQUIPMENT

1. ARMAMENT.

a. GUNNERY.

(1) GENERAL.—Four .50 cal. machine guns are installed in the lower forward section of the fuselage and four 20 mm aircraft cannon are installed in the wing inner panels (two left and two right).

Note

Airplanes Ser. No. 80259 - 80263 incl. (except 80264) are equipped with four .50 cal. machine guns in the fuselage and four M-2 20 mm. cannon in the wings. Airplanes Ser. Nos. 80264 and 80294 and subs. have the same fuselage guns and four M-3 (T-31) 20 mm. cannon in the wings. The fuselage guns are removed from F7F-3N and -4N airplanes.

The four fuselage gun ammunition boxes are installed through hinged doors in the skin; the boxes for the left hand guns are installed from the left and those for the right hand guns from the right.

The four wing gun ammunition box assemblies are installed through large hinged access doors which are parts of the wing upper surface.

Ammunition box capacities:

<i>Gun</i>	<i>Max. Rounds each gun</i>	<i>Total Rounds available</i>
20 mm. wing (4)	200	800
.50 cal fuselage (4)	400	1600

The guns are charged hydraulically and fired electrically. Provision is made for the installation of automatic electric heaters on the gun breeches.

Note

The circuit is connected directly to the generators through circuit breakers, and the heaters will be energized whenever the generators are running. The battery will not energize the heaters. The plugs must be pulled to prevent the heaters from operating when the engines are running.

Firing restrictions:

<i>Gun</i>	<i>Length of burst</i>	<i>Interval</i>
.50 cal.	75 rounds—first (6 sec.)	1 Min.
	25 rounds—subsequent (2 sec.)	1 Min.
20 mm	Governed by orders of type commander.	

All guns are set to fire in a line parallel to the line of flight, in the horizontal plane. In the vertical



Figure 43—Gun Charging Controls

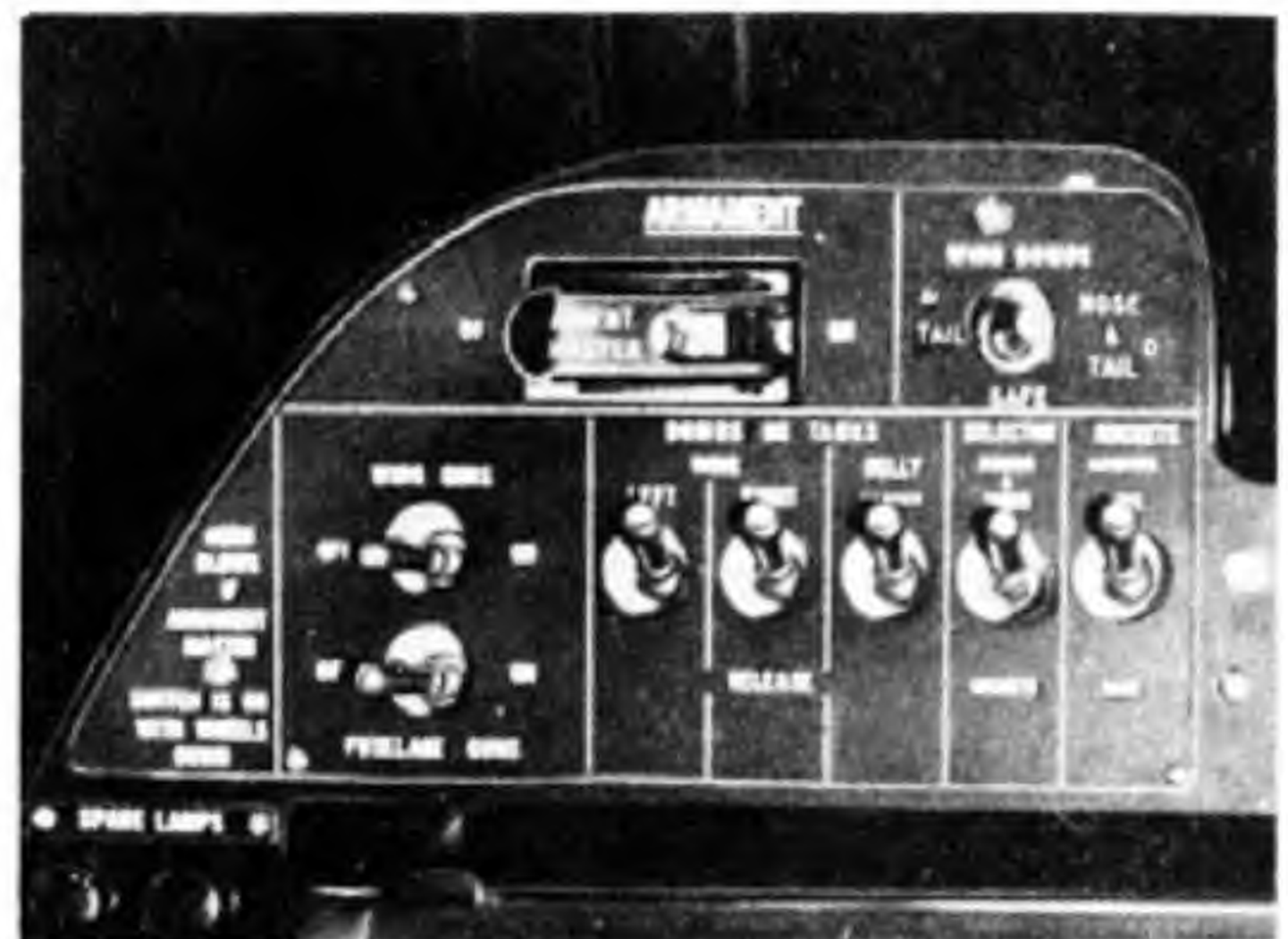
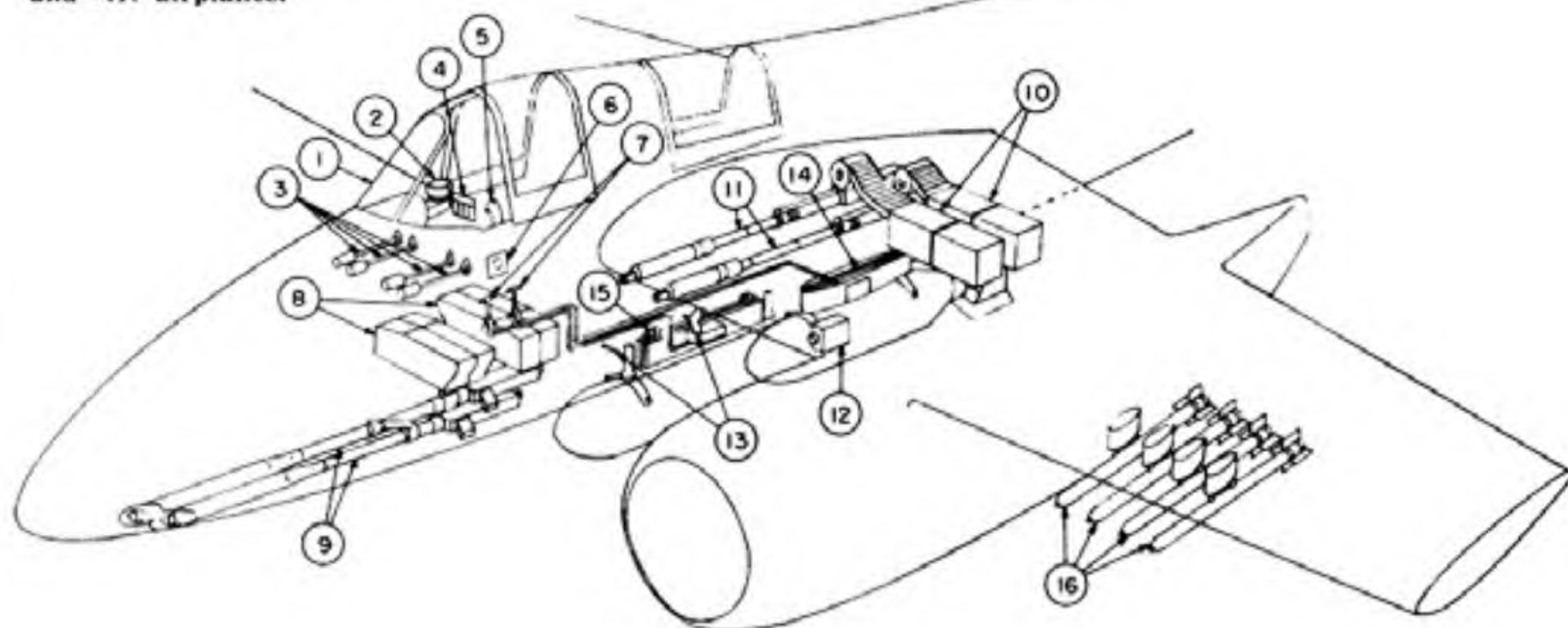


Figure 44—Armament Control Switches

NOTE: Fuselage guns removed from F7F-3N and -4N airplanes.



- | | |
|--|-------------------------------|
| 1. Bullet Resistant Glass Windshield | 9. Fuselage Guns |
| 2. Gun Sight | 10. Wing Gun Ammunition Boxes |
| 3. Gun Charging Handles | 11. Wing Guns |
| 4. Armament Switch Panel | 12. Gun Camera |
| 5. Trigger Buttons on Stick | 13. Boresighting Rods |
| 6. Gunsight Light Rheostat and Switch | 14. Wing Bomb Rack |
| 7. Fuselage and Wing Bomb Manual Release Handles | 15. Fuselage Bomb Rack |
| 8. Fuselage Gun Ammunition Boxes | 16. Rockets |

Figure 45—Armament Installation

plane, all wing guns are set to fire in a line parallel to the fuselage datum line. The fuselage guns' firing lines are parallel and the upper guns' firing lines converge with the gun sight line at 250 yards.

A Mark 8 illuminated gun sight is installed above the main instrument panel.

(2) GUN CONTROLS. — The four hydraulic charging controls are located along the bottom of the main instrument panel.

Left to right

- Left wing guns
- Left fuselage guns
- Right fuselage guns
- Right wing guns.

(a) TO CHARGE GUNS.

1. Set handle pointers UP (to CHARGE).
2. Push handles FULL IN. Handles will automatically release, springing out when guns are charged.

3. Turn COUNTERCLOCKWISE 90° (pointer HORIZONTAL TO LEFT) to SAFETY position.

(b) TO SAFETY GUNS.

1. Set handle pointers to LEFT (90°) to SAFETY position.

2. Push handle FULL IN. Handle will remain in position.

(c) TO CHARGE FROM SAFETY POSITION.

1. Turn handles CLOCKWISE to UP — CHARGE position. The handles will then release automatically.

2. Push handles FULL IN. The handles will release automatically when guns are charged.

(d) AUXILIARY OPERATION. — If the engine driven hydraulic pump is not operating use the hand pump system as follows:

1. Set hand pump selector valve lever to WING FOLD.—GUNS—ARREST. HOOK.

2. Operate hand pump five strokes (approximately).

3. Set charging handle pointers UP — to CHARGE position.

4. Push handles FULL IN.

5. Operate hand pump until sufficient pressure is built up to charge guns, when handles will spring out automatically (800 p.s.i. approx.).

6. To safety guns.

- a. Set handle pointers to LEFT 90° to SAFETY position.

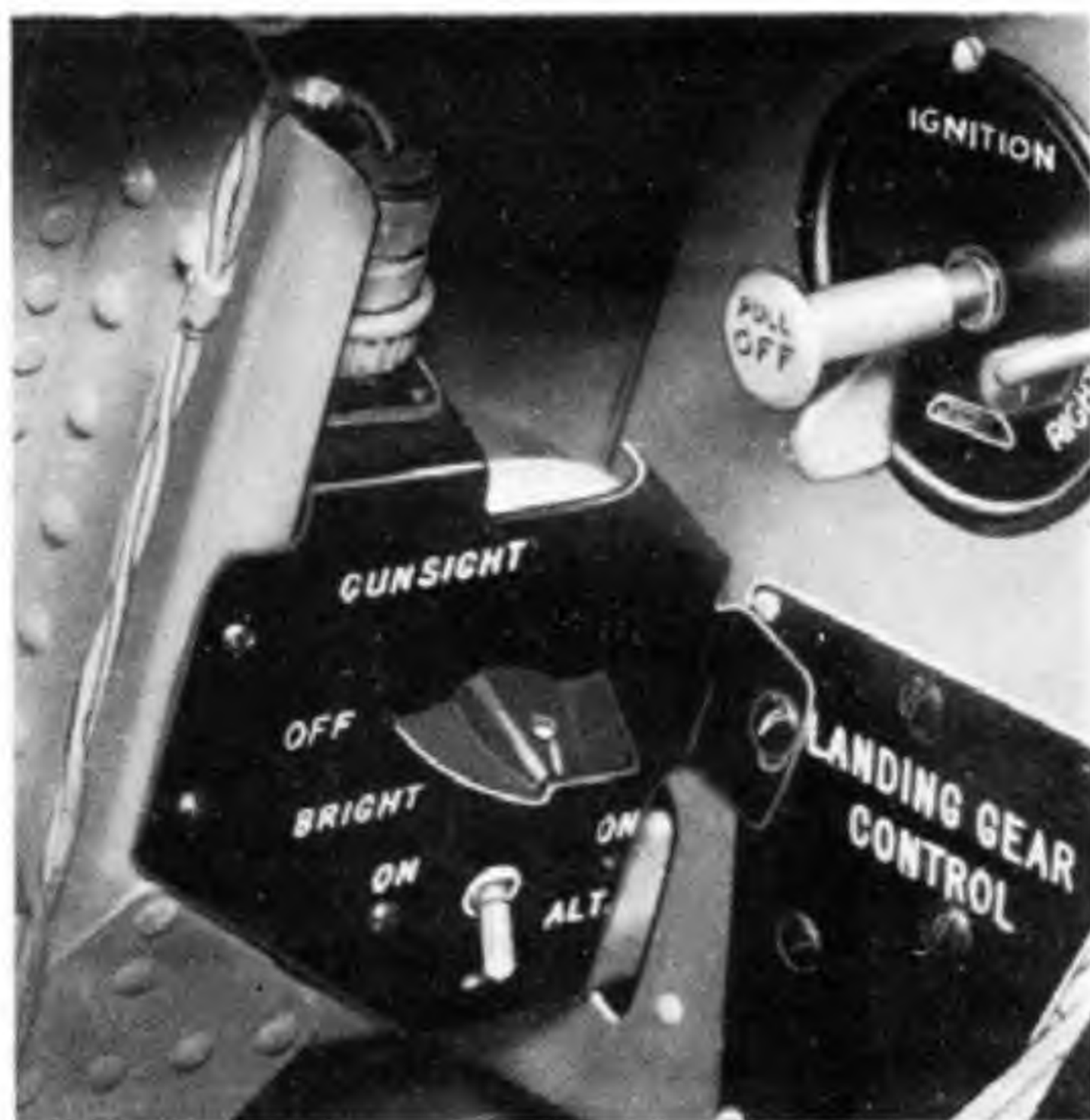


Figure 46—Gun Sight Light Controls

- b. Push handles FULL IN.
- c. Operate hand pump, etc. (See paragraph (d)5. above.)

(e) ARMAMENT MASTER SWITCH.

1. Set to RIGHT to ON.
2. Set to LEFT to OFF.

(f) GUN SELECTOR SWITCHES.

Wing guns—upper switch
Fuselage guns—lower switch

1. Set to RIGHT to ON.
2. Set to LEFT to OFF.

(g) GUN TRIGGER SWITCH. — Button on front of stick grip—PRESS to FIRE.

CAUTION

In the event of uncontrolled fire (runaway guns) set charging handles at SAFE position.

(3) GUN SIGHT LIGHT CONTROLS. — The toggle switch and rheostat are located on left side of cockpit, below rail, adjacent to ignition switch.

Set switch AFT to ON.

Set FORWARD to ON—ALTERNATE.

(Bulb has two filaments—alternate for reserve.)

Rotate the rheostat CLOCKWISE to ON and BRIGHT—COUNTERCLOCKWISE TO OFF.

WARNING

Safety guns before landing.

b. BOMBING EQUIPMENT.

(1) GENERAL.—A type D-6 bomb rack is installed in the fuselage to carry a 2000 lb. bomb, and a

Mk 51 bomb rack is installed in each wing inner panel to carry either a 1600 or 1000 lb. bomb. A 500 lb. bomb may be carried in either rack.

Bomb control switches are installed on the upper left side of the main instrument panel and the bomb release button is installed on the control stick grip.

Manual bomb release handles for the fuselage and wing bombs are installed on the cockpit floor, left side forward.

(2) BOMB CONTROLS.

(a) ARMAMENT MASTER SWITCH.

1. Set to RIGHT to ON.
2. Set to LEFT to OFF.

(b) BOMB SELECTOR SWITCHES.

Left wing bomb—left
Right wing bomb—center
Belly (fuselage) bomb—right.
Set to DOWN to RELEASE.

(c) WING BOMB SAFE-ARM SWITCH.

1. Set to LEFT to SAFE.
2. Set to RIGHT to ARM.

(d) FUSELAGE (BELLY) BOMB MANUAL RELEASE.—Aft "T" handle on left side of cockpit floor below engine quadrant.

1. Handle pushed FULL DOWN and rotated FULL COUNTERCLOCKWISE — BOMB LOCKED against electrical release.

2. To cock release unit, to release bomb (ARMED) by electrical switches—PULL UP until slot hits stop, ROTATE 1/4 turn CLOCKWISE.

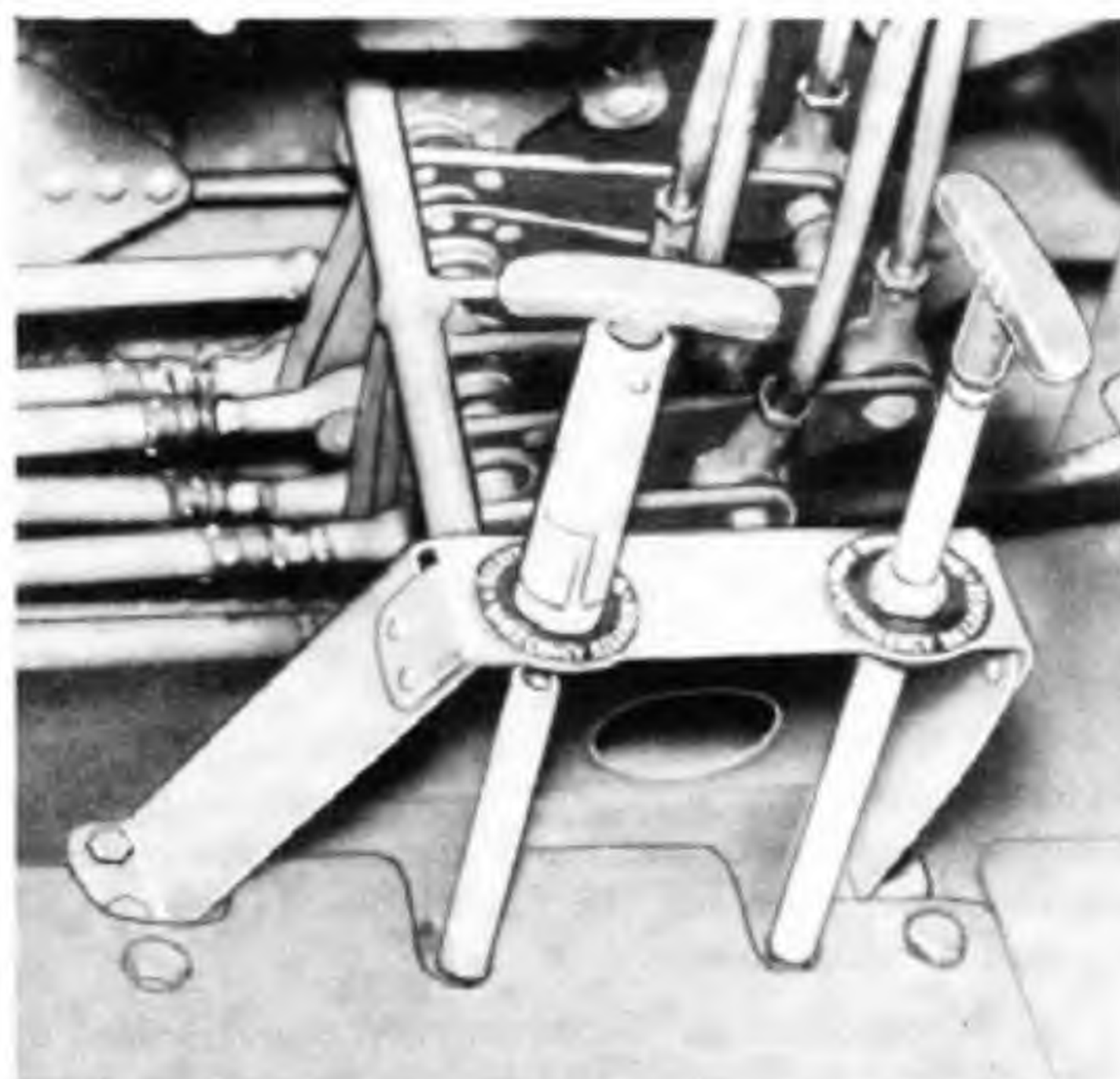


Figure 47—Manual Bomb Release Handles

3. To MANUALLY RELEASE THE BOMB SAFED, PULL UP QUICKLY after rotating as in 2. above.

Note

1.

The fuselage bomb may only be released ARMED ELECTRICALLY, SAFED MANUALLY. The "T" handle safe release operates regardless of the toggle or trigger switches. For electrical armed release, the toggle and trigger switches must be operated.

2.

Wing bomb safe—arm switch and bomb sway brace provisions are not installed on airplanes serial nos. 80259 and 80260.

(e) WING BOMB MANUAL RELEASE (FOR EMERGENCY JETTISON).—"T" handle on left side of cockpit floor forward of fuselage bomb control.

1. To release bombs—pull UP forward "T" handle.

c. ROCKET PROJECTILE PROVISIONS.

(1) GENERAL.—Rocket projectile provisions are installed in model F7F airplanes, Serial No. 80294 and subsequent. The installation consists of a bomb-rocket selector, an arm nose-tail switch, a station distributor, wiring and pylons (launchers).

Note

Mk. 5 pylons are installed in airplanes Serial Nos. 80294-80507 inclusive. Mk. 9 pylons are installed in airplanes Serial No. 80508 and subsequent. The systems otherwise are identical.

(2) OPERATION.—To release rockets:

(a) Select rockets on Mk. 1 station selector—outboard, mid-outboard, mid-inboard or inboard.

(b) Set "Bomb or Rocket" selector to "ROCKET".

(c) Set arming switch to "ARM NOSE" or "ARM TAIL," as desired.

(d) Set Armament Master switch to "ON."

(e) Press bomb release switch button on stick grip.

d. MISCELLANEOUS EQUIPMENT.

(1) ARMOR PROTECTION.—The pilot and radar operator are protected from gun fire by face hardened steel armor and heavy aluminum alloy plates. Provision is made for the installation of wing gun ammunition box armor.

A section of $\frac{3}{8}$ " face hardened armor bolted to the bulkhead forward of the cockpit extends up from cockpit floor to the cowl. The cowl deckplate on



Figure 48—Tow Target Control

which the bullet resistant windshield is mounted is made up of $\frac{1}{4}$ " aluminum alloy.

An assembly of three $\frac{5}{8}$ " aluminum alloy plates and one small $\frac{1}{4}$ " face hardened steel plate is installed on the pilot's cockpit floor as protection against ground fire.

At the rear of the pilot's cockpit two plates of armor are installed; the lower, $\frac{3}{8}$ " face hardened steel, and the head and body (upper), $\frac{1}{2}$ " face hardened steel, give protection against gunfire from the rear.

In the night fighters two pieces of steel armor plate similar to those behind the pilot protect the radar operator from gunfire from the rear.

(2) TOW TARGET EQUIPMENT.

(a) A spring loaded latch is installed in the fuselage tail cone assembly for attaching a standard tow target. The target release is controlled by a cable operated by the arresting hook control lever on the right hand side of the cockpit. When the lever is moved aft the latch is pulled to allow the target to drop clear and the spring brings the latch back into position.

(b) To drop tow target—

1. Move control lever FULL AFT.

2. When target is clear, RETURN control lever to FULL FORWARD position.

Note

Remove access plate from tail cone assembly to attach target. In F7F-1 airplanes, serial nos. 80259-80264 inclusive, the tow target latch is installed on the tail skid assembly (this assembly not installed on airplanes Serial No. 80265 and subs.).

2. OXYGEN.

a. CYLINDER AND CONTROL.—A standard 514 cu. in. capacity shatterproof oxygen cylinder is installed in the fuselage nose, below the floor, on the right hand side.

The shut-off valve handwheel, rotating a shaft connected to the cylinder by a chain and sprocket (two right angle drive units and shaft on airplanes Serial No. 80359 and subs.) assembly, is mounted on the pilot's right side control and instrument panel.

TO OPEN ROTATE—COUNTERCLOCKWISE.

A flow indicator is installed on the R.H. cockpit rail.

In night fighters a separate cylinder with direct control is installed for the use of the radar operator. The cylinder is mounted in brackets on the left side of the cockpit; the regulator is mounted forward of it, below the instrument panel and the flow indicator is mounted on the instrument panel.

b. REGULATOR. — The diluter-demand regulator is designed to meet the demands of the inhalation phase of the breathing cycle and deliver either a properly proportioned mixture of air and oxygen or 100% oxygen dependent upon the setting of the adjustable air-valve lever. With the air-valve set to the ON or NORMAL OXYGEN position, air is drawn into the breathing system and is automatically mixed with oxygen from the supply cylinder to give the total needed oxygen required up to approximately 30,000 ft., beyond which 100% oxygen is delivered. With the air-valve set to the OFF or 100% OXYGEN position, 100% oxygen is delivered at all altitudes. With the air-valve of the diluter-demand regulator set to the ON or NORMAL OXYGEN position, a relatively small inhalation suction (one inch of water suction)

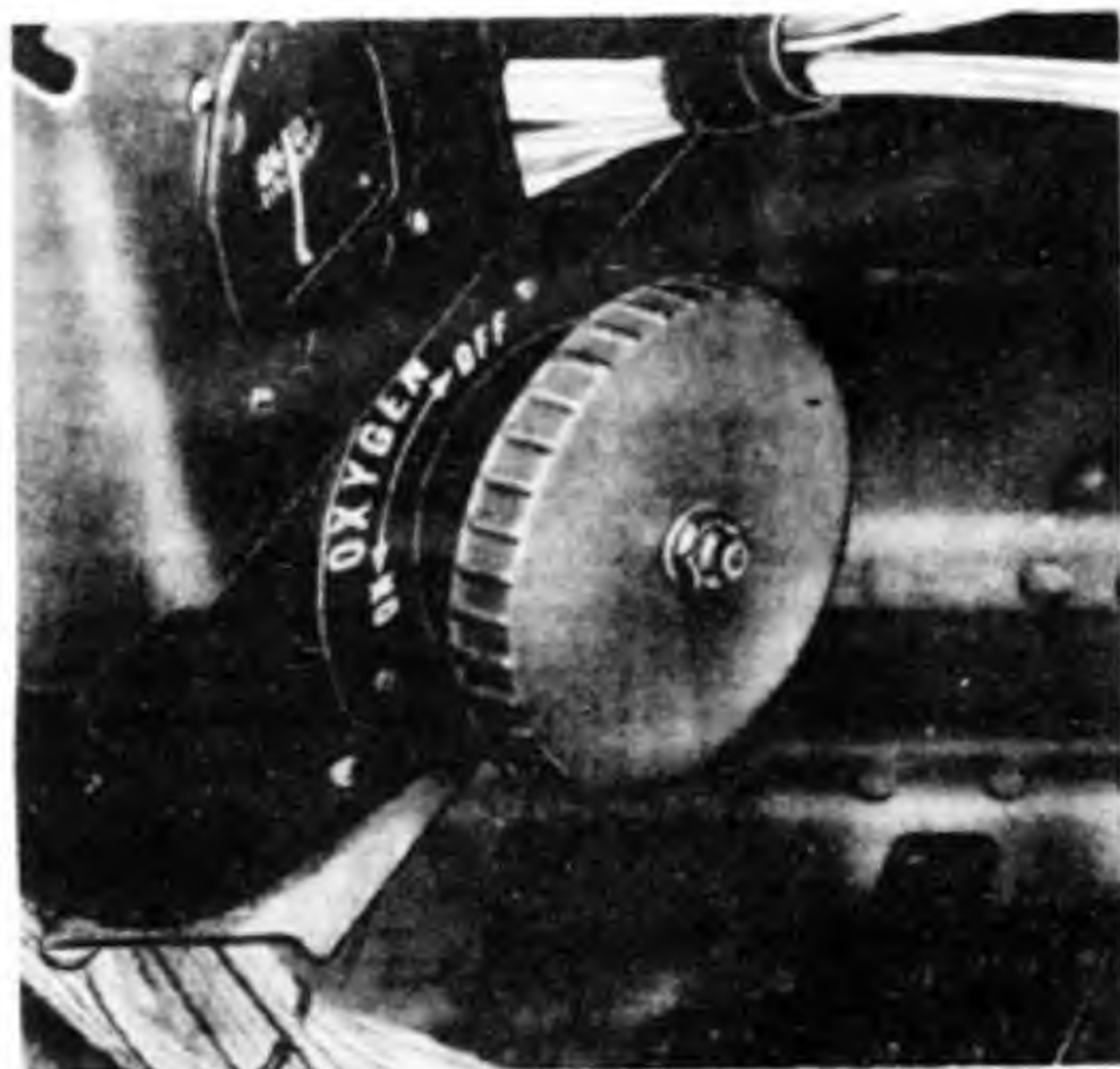


Figure 49—Pilot's Oxygen Cylinder Control



Figure 50—Oxygen Regulator

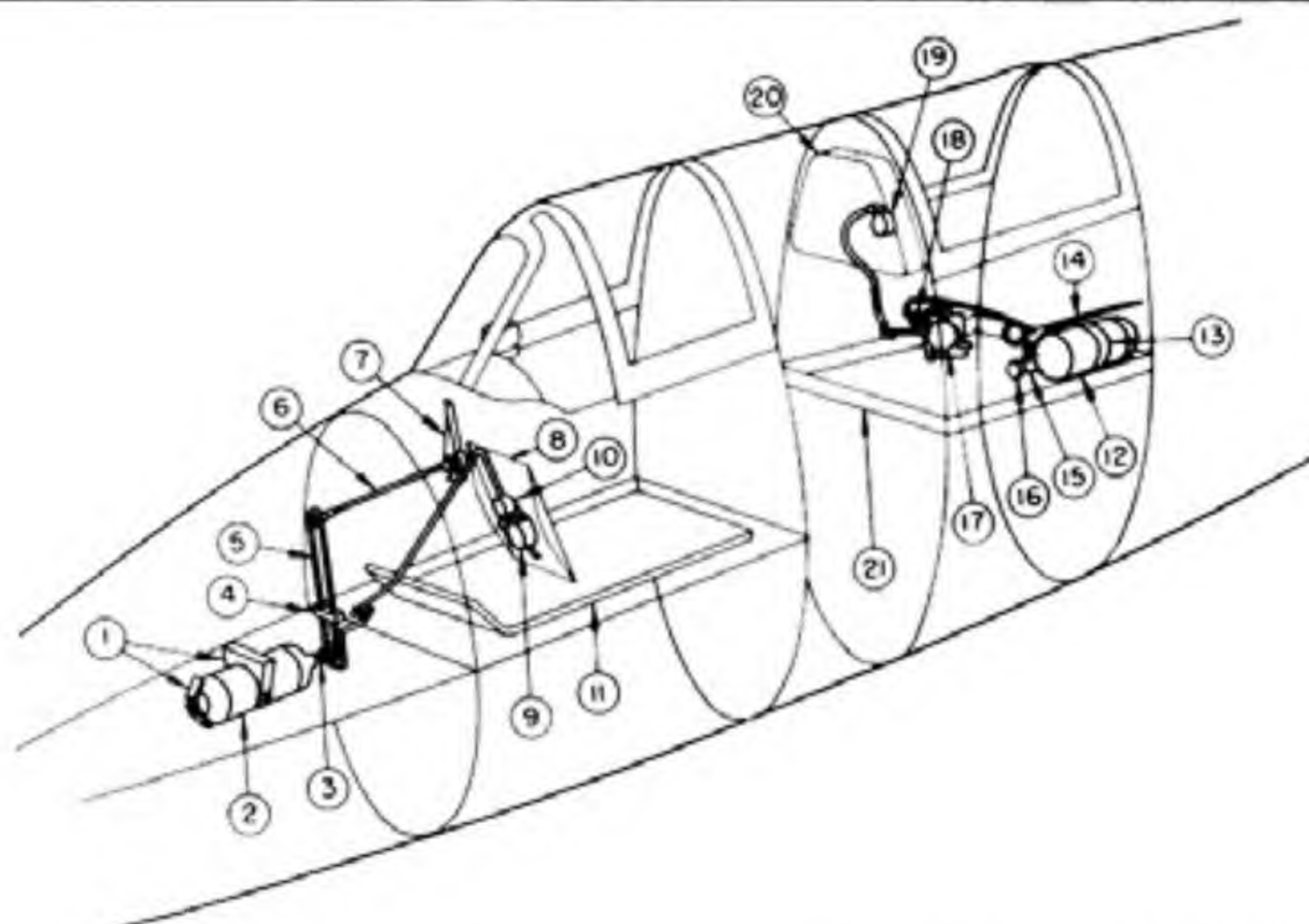
is sufficient to deliver a flow of 150 liters of oxygen per minute. This characteristic assures the user an adequate oxygen flow and ease of breathing.

The regulator is attached directly to the high pressure oxygen supply through $\frac{3}{16}$ inch O.D. copper tubing connected to the cylinder; the pressure in the cylinder may decrease from 1800 or 2000 pounds per square inch to 50 pounds per square inch without effecting the normal operation of the regulator.

c. PREFLIGHT CHECK LIST. — The following items should be checked while the plane is on ground prior to flight in which oxygen is to be used, or is likely to be used, to assure proper functioning of the oxygen system.

- (1) Emergency valve—closed.
- (2) Open cylinder valve, allow at least ten seconds for pressure in line to equalize. Pressure gage should read 1800 ± 50 p.s.i., if the cylinder is fully charged.
- (3) Close cylinder valve. After a few minutes observe pressure gage and simultaneously open cylinder valve. If gage pointer jumps—leakage is indicated.
 - (a) If leakage was found by (3) above test further. Open cylinder valve, carefully noting pressure gage reading—then close cylinder valve. If gage pointer drops more than 100 p.s.i. in five minutes there is excessive leakage, and oxygen system must be repaired prior to use.

- (4) Check mask fit by placing thumb over end of mask tube and inhale lightly. If there is no leakage, mask will adhere tightly to face due to suction created. If mask leaks — tighten mask suspension straps and/or adjust nose wire. **DO NOT USE MASK THAT LEAKS.**



PILOT'S EQUIPMENT

1. Support Cradle and Bracket
2. 514 cu. in. Oxygen Cylinder
3. Cylinder Valve and Line Outlet
4. Chain Guide Block
5. Chain Assembly
Chain and sprocket replaced by drive shaft and right angle drive units in airplanes #80359 and subsequent
6. Control Shaft, Knob and Sprocket
7. Right Side Instrument Panel
8. Lower Instrument and Control Panel
9. Diluter Demand Regulator
10. Flow Indicator
11. Floor Armor Plate

RADAR OPERATOR'S EQUIPMENT (F7F-2N only)

12. 514 cu. in. Oxygen Cylinder
13. Strap Assembly
14. Cover Assembly
15. Cylinder Valve and Line Outlet
16. Direct Control Knob
17. Diluter Demand Regulator
18. Cylinder Pressure Gage
19. Flow Indicator
20. Instrument Panel
21. Floor Assembly (Tank Top)

Figure 51—Oxygen Equipment Diagram

(5) Couple mask securely to breathing tube by means of quick disconnect coupling. **IMPORTANT:** Mating parts of coupling must not be "cocked" but be fully engaged.

(6) Open cylinder valve. Depress diaphragm knob through hole in center of regulator case, and feel flow of oxygen into the mask — then, release diaphragm knob. Breathe several times observing oxygen flow indicator (if installed) for "blink" verifying the positive flow of oxygen.

Note

Since the amount of added oxygen is very small at sea level the oxygen flow meter may not operate while the airplane is on the ground. In this case turn air-valve to OFF or 100% OXYGEN and test again. If oxygen flow indicator operation is now satisfactory, reset air-valve to ON or NORMAL OXYGEN in which setting adequate oxygen flow and "blinker" operation will be assured at oxygen use altitudes.

(7) Check emergency valve by turning counter-clockwise slowly until oxygen flows vigorously into mask—then close emergency valve.

d. OPERATING INSTRUCTIONS.

(1) Turn on oxygen supply pressure if not already on. Pressure gage should read approximately 1800 psi, if cylinder is fully charged.

(2) Set air-valve to "Normal Oxygen" for all normal flight conditions.

(3) Put on mask. Fully engage mating portions of disconnect coupling to connect mask to oxygen system breathing tube and attach clip to parachute harness (or clothing) sufficiently high on the chest to permit free movement of head.

(4) To check mask fit, squeeze mask tube and inhale lightly. If there is no leakage, mask adheres tightly to face and a definite resistance to inhalation is encountered. If mask leaks, tighten mask suspension straps.

CAUTION

Never obstruct free flow of oxygen from regulator while the Emergency Valve is on.

(5) While on oxygen frequently check:

- (a) Cylinder pressure gage for oxygen supply.
- (b) Oxygen flow indicator for flow of oxygen through regulator.
- (c) Mask fit for leak tightness.
- (d) Disconnect coupling to insure that it is fully engaged.

(6) Emergency Conditions:

(a) Should symptoms occur suggestive of the onset of anoxia, or the regulator become inoperative, immediately turn on Emergency Valve and descend below 10,000 feet.

(b) Whenever excessive carbon monoxide or other noxious or irritating gas is present or suspected; then, regardless of the altitude, the air valve should be set at "OFF" or "100% OXYGEN" position, and undiluted oxygen used until danger is passed or flight is completed.

(c) Should brief removal of mask from the face be necessary at high altitude, use the following procedure:

1. Take three or four deep breaths of 100% oxygen (air valve lever to "OFF" or "100% OXYGEN" position).
2. Hold breath and remove mask from face.
3. As soon as it is practicable, replace the mask to face and take three of four deep breaths of 100% oxygen.
4. Reset air valve lever to "ON" or "NORMAL OXYGEN" position.

(7) Do not exhaust supply cylinder below 300 psi, except in an emergency.

(8) Upon completion of flight, turn off oxygen supply.

Note

The emergency valve shall be closed at all times, except in an emergency—then open emergency valve slowly to minimum flow required.

3. COMMUNICATION AND ELECTRONIC EQUIPMENT.

a. COMMUNICATION EQUIPMENT—MODEL F7F-1N AIRPLANE.

(1) COMMUNICATING RADIO.—AN/ARC-5 receiving and transmitting equipment is installed in the fuselage between Stations 318 and 362. The following controls are installed in the pilot's cockpit:

(a) RADIO MASTER SWITCH.—On top of electrical control panel.

(b) MASK MICROPHONE "PRESS-TO-TALK" SWITCH BUTTON.—On inboard (right engine) throttle handle.

(c) HAND MICROPHONE. — Microphone stowed in clip on right side of cockpit.

(d) C-38/ARC-5 RECEIVER CONTROL UNIT.—On right hand side of cockpit.

(e) C-30/ARC-5 VHF TRANSMITTER CONTROL UNIT.—On right hand side of cockpit.

(2) NAVIGATION RECEIVER.—An AN/ARR-2 receiver is installed in the fuselage with the AN/ARC-5 units. It is controlled by the communicating controls.

(3) FERRY RADIO.—An R-23/ARC-5 LF range receiver and associated tunable control C-26/ARC-5 is installed for ferrying use.

(4) TACTICAL RADIO.—In service, the tunable LF radio range receiver and associated control can be replaced by the lock tuned HF receiver. To put this HF receiver into operation, the plug in the middle position in the receiver rack must be removed and replaced by the plug stowed on the aft side of Station 318 bulkhead, directly in front of the receiver rack.

With this arrangement this receiver is controlled by the REC C switch on the pilot's C-38/ARC-5 control unit and the C-26/ARC-5 control and associated cables are not used.

(5) OPERATION.

(a) Plug in the microphone and headset in the jacks (aft of the control units) making sure that the plugs are completely engaged.

(b) Set radio master switch to "ON".

(c) RECEPTION.

1. VHF RECEIVER. — To select the VHF channel desired, push one of the four top buttons on the transmitter control unit; the push button acts as an ON switch as well as a channel selector. Set switch "A" on the receiver control unit in the "UP" position, the toggle switch "C" in the "OFF" position, and the OUTPUT control knob in the minimum output position, and reception will be obtained only on the VHF channel selected. The sensitivity control above switch "A" should be set at maximum (position no. 11).

2. HF RECEIVER.—Set toggle switch "C" on the receiver control unit in the "UP" position and set

the sensitivity control above switch "C" as desired. Make certain that the toggle switch "A" on the receiver control unit is in the "OFF" position, and that the OUTPUT control knob on the receiver control unit is in the minimum position while thus setting the level; however, unless sensitivity control is set for "MAX. TOLERABLE NOISE", weak signals may not be heard.

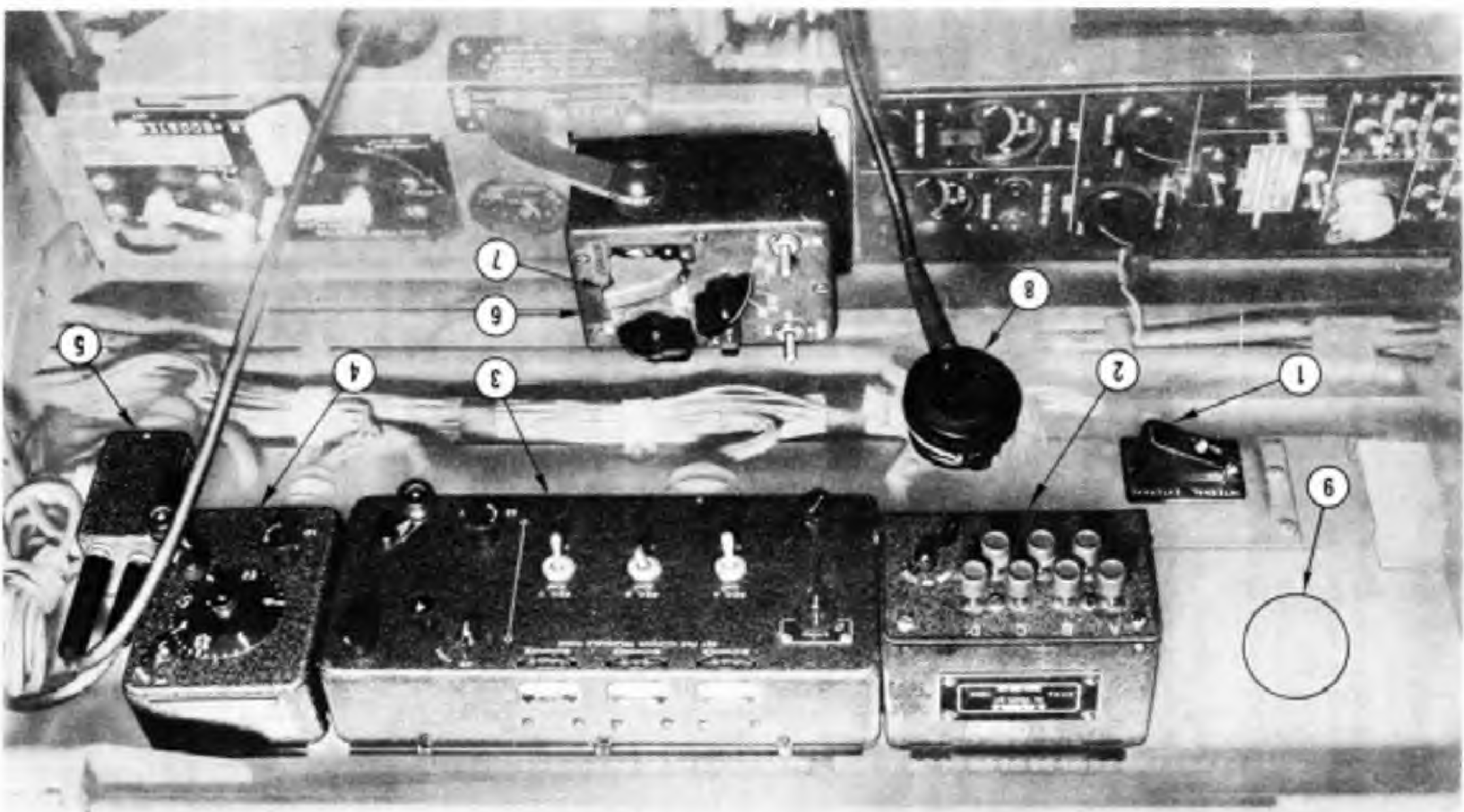
3. NAVIGATION RECEIVER.—Operate the crank on the receiver control unit to bring the assigned channel number in the window. Set the NAV-VOICE selector switch to "NAV". After making certain that the toggle switches for the VHF and HF (receivers "A" and "C") are in the "OFF" position, set the OUTPUT control to obtain a usable weak signal, or if the desired signal cannot be heard, to a fairly strong background hiss. The volume control should not be adjusted after once being set when navigating with the AN/ARR-2. Initially, the volume control of the C-38/ARC-5 should be set as high as can be tolerated and the OUTPUT control of the AN/ARR-2 operated as low as possible. Adjust the BEAT-NOTE control to produce a pleasing audible tone. If the signal is too strong, a clear cut indication of the course cannot be obtained.

4. SIMULTANEOUS OPERATION. — Normally all three receivers should be in operation with their outputs fed simultaneously into the headphones, unless specific orders to the contrary have been received. The volume control on the receiver control must necessarily be adjusted to obtain optimum output from the VHF receiver. To obtain the same output from the HF receiver, it is therefore necessary to adjust the sensitivity control above switch "C" on the receiver control unit. The volume of the navigation receiver should be adjusted only by its own OUTPUT control. In ferry operation, the range receiver output should be adjusted only by its own volume control, with the C-38/ARC-5 volume control in the full "ON" position.

(d) TRANSMISSION.—When the receiving equipment has been put in operation as described above, the transmitters may be put in operation as follows:

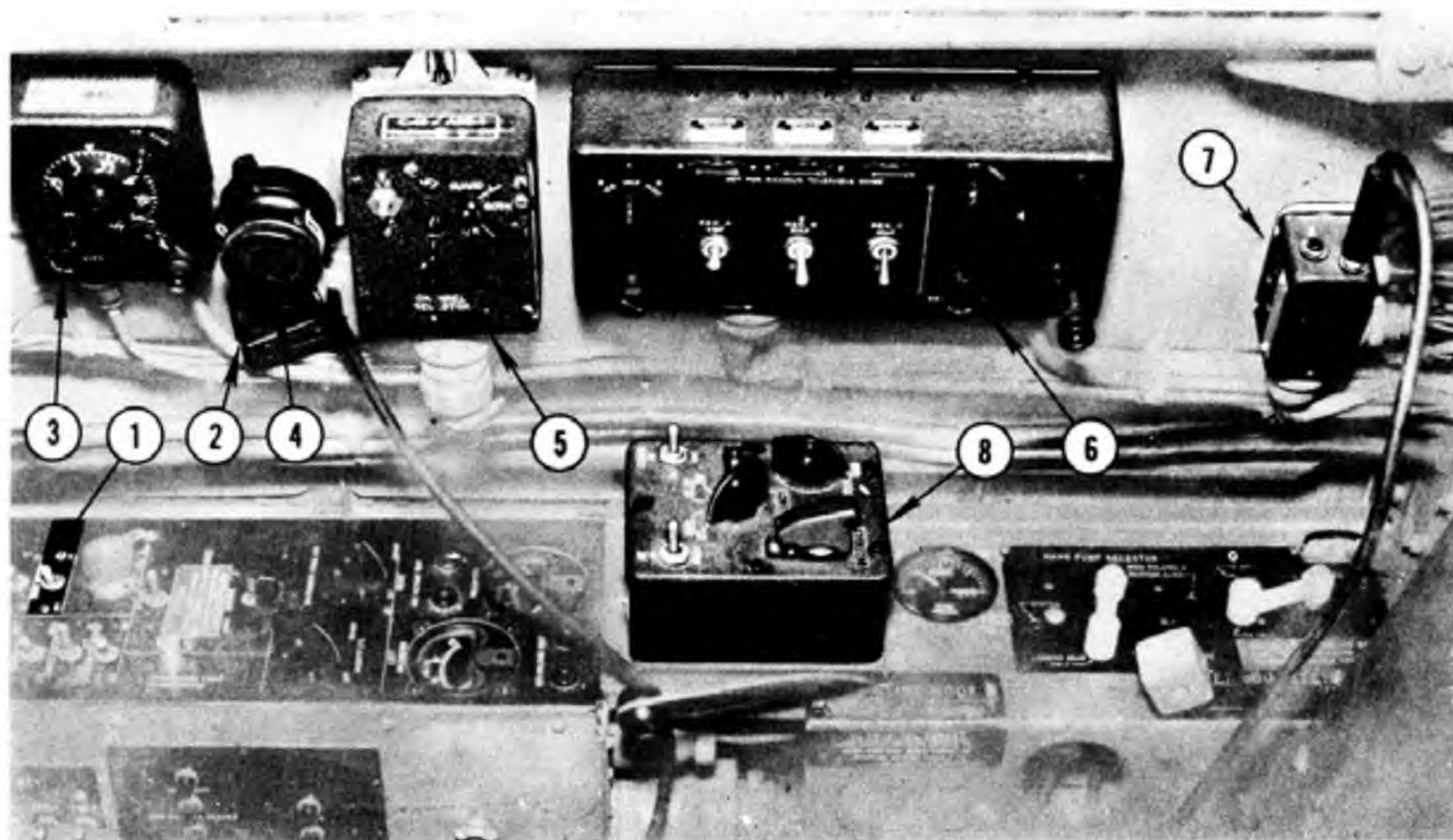
1. VHF TRANSMITTER.—Select the desired VHF channel by pushing one of the top four buttons on the transmitter control unit. Make certain that the TONE-CW-VOICE switch is in the "VOICE" position. Wait four seconds after operating the push-button, then press the "press-to-talk" switch and commence transmission. To receive, release the "press-to-talk" switch.

2. HF TRANSMITTER.—Push button no. 2 on the transmitter control unit. Make certain that the TONE-CW-VOICE switch is in the "VOICE" position. It should be noted that pushing button no. 2 does not in any way disturb reception on the VHF channel. Button no. 3 must not be used in this installation.



1. Test Power (Internal—External) Switch
2. VHF Control Unit (C-30/ARC-5)
3. Control Unit (C-38/ARC-5)
4. LF Control Unit (C-26/ARC-5)
5. Jack Box (J-22/ARC-5)
6. IFF Control Unit
7. "DESTRUCT" Switch
8. Hand Microphone
9. Location of Main Radar Control Unit
10. Radio Master Switch

Figure 52—Pilot's Communicating Controls (F7F-1N Airplane)



- | | |
|---|---|
| 1. Radio Master Switch | 5. VHF Transmitter Control (C-45/ARC-1) |
| 2. Radar AC Test Power (Internal—External) Switch | 6. Receiver Control (C-38/ARC-5) |
| 3. Range Receiver Control (C-26/ARC-5) | 7. Jack Box (J-22/ARC-5) |
| 4. Hand Microphone | 8. IFF Control (C-57/APX-2) |

Figure 53—Pilot's Communicating Controls (F7F-2N Airplane)

(e) OPERATING NOTES AND PRECAUTIONS.

1. AFTER PUSHING ANY ONE OF THE TOP FOUR BUTTONS ON THE TRANSMITTER CONTROL UNIT, WAIT AT LEAST FOUR SECONDS BEFORE PUSHING BUTTON NO. 2. IF THIS CAUTION IS NOT OBSERVED, THE BAND SELECTOR MOTOR MAY CONTINUE TO RUN AND DANGEROUSLY OVERHEAT. IT MAY BE STOPPED BY PRESSING BUTTON "A", "B", "C" or "D". BUTTON no. 3 should not be pushed because RADIO TRANSMISSION WILL NOT TAKE PLACE in spite of the fact that sidetone will be heard. All buttons on the control unit, except the OFF button, turn the transmitters on in addition to selecting the proper channel. The various channels are selected in turn as desired. At the conclusion of the transmission the transmitters are shut down by pushing the OFF button.

2. Voice transmission, only, is provided by this installation although the selector switch on the transmitter control unit is labeled TONE-CW-VOICE. The selector should be set to "VOICE" at all times, preferably safety-wired.

(6) IFF EQUIPMENT.—The AN/APX-2 transmitter-receiver, RT-24/APX-2, is installed aft of Sta-

tion 362. The pilot's control unit, C-57/APX-2 is located on the hydraulic control panel on the right side of the cockpit. The control unit, C-56/APX-2, is located adjacent to the transmitter receiver and is not accessible during flight.

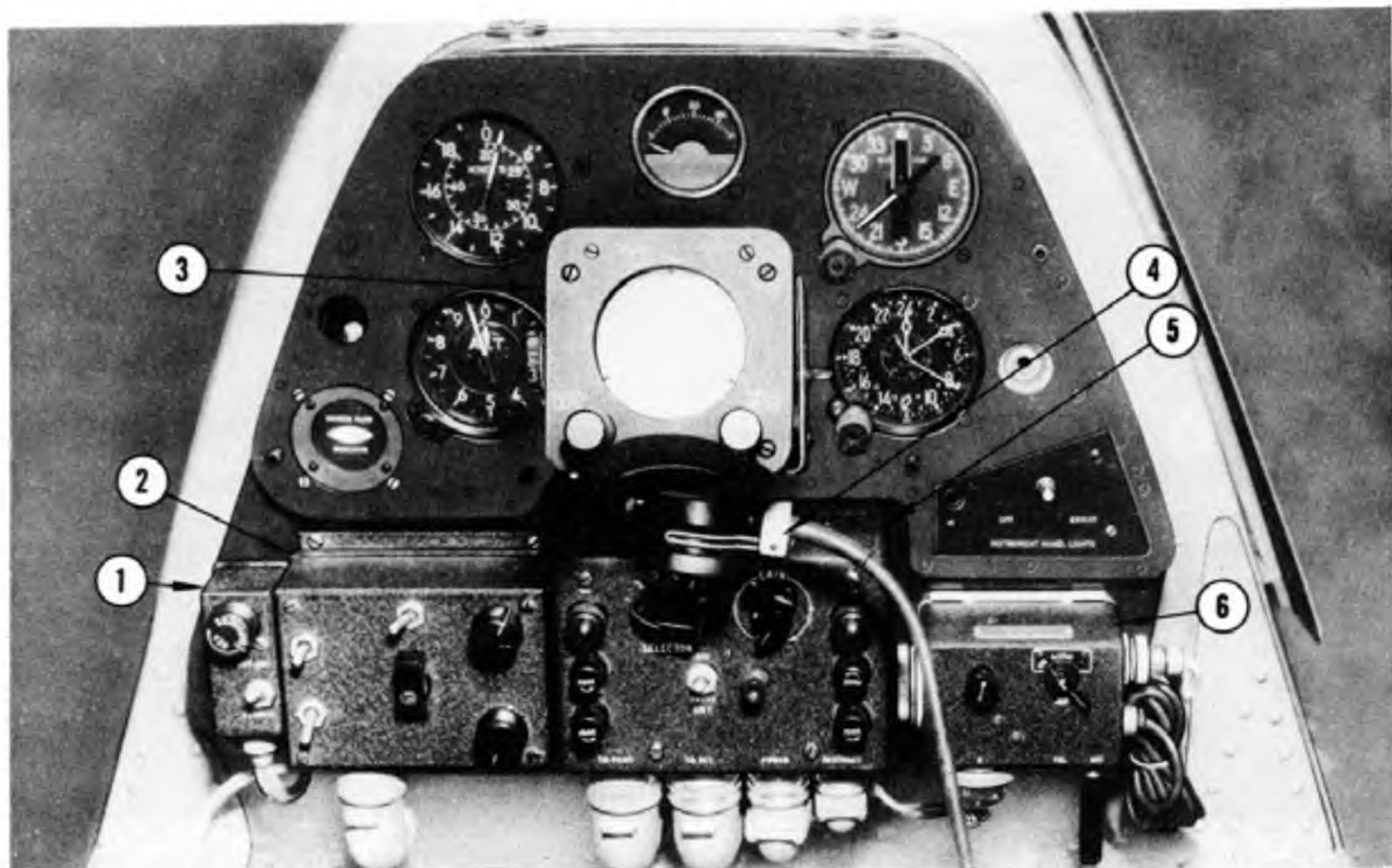
(a) OPERATING INSTRUCTIONS.

1. TO START THE EQUIPMENT.—On the pilot control unit, C-57/APX-2, rotate the master control switch clockwise away from the "OFF" position and set it in the desired operating position (normally "NORM.").

2. TO CHANGE REPLY CODE.—On control unit, C-56/APX-2, rotate the selector switch to the position designated by the commanding officer. Unless otherwise designated, this switch is set and left in position "1". This adjustment is made by the ground check crew, and cannot be changed in flight.

3. FOR G-BAND OPERATION.—On the pilot control unit throw the G-Band switch to the "ON" position or flip it to the "TIME" position.

4. FOR INT OPERATION.—On the pilot control unit throw the INT switch to the "ON" position or hold it momentarily in the "PRESS" position. The intensity of the response, which is displayed on the radar indicator, is set by the GAIN control on the pilot control unit.



1. Radar Auxiliary Control (C-47/APS-6)
2. Radar Main Control (C-46/APS-6)
3. Radar Indicator (ID-32/APS-6)
4. Hand Microphone
5. IFF Control Unit (C-56A/APX-2)
6. Transmitter Control Unit (C-39/ARC-5)

Figure 54—Radar Operator's Communicating Controls (F7F-2N Airplane)

5. FOR DISTRESS OPERATION.—On the pilot control unit push the guard latch to the right (tilting it up) and rotate the master control switch to the "EMERGENCY" (extreme clockwise) position.

6. TO DESTROY THE RECEIVER-TRANSMITTER UNIT.—If possible, warn radar operator. On the pilot control unit raise the red guard cover breaking the safety wire, and throw the DESTRUCT switch to the "ON" position. This will explode all Type AN/M-1 Destructors in the unit.

7. FURTHER OPERATING PROCEDURES.—Information on further operating procedures must be obtained from the commanding officer.

8. TO STOP THE EQUIPMENT.—On the pilot control unit rotate the master control switch to the extreme counterclockwise position, marked "OFF".

(7) RADIO ALTIMETER.—The AN/APN-1 radio altimeter transmitter-receiver is installed in the fuselage radio compartment on the right side, aft of the ladder bracket. The antennae are installed on the underside of each wing inner panel. The indicator and the limit indicator lights are on the right side of

the pilot's instrument panel. The limit switch is on the pilot's lower right instrument panel.

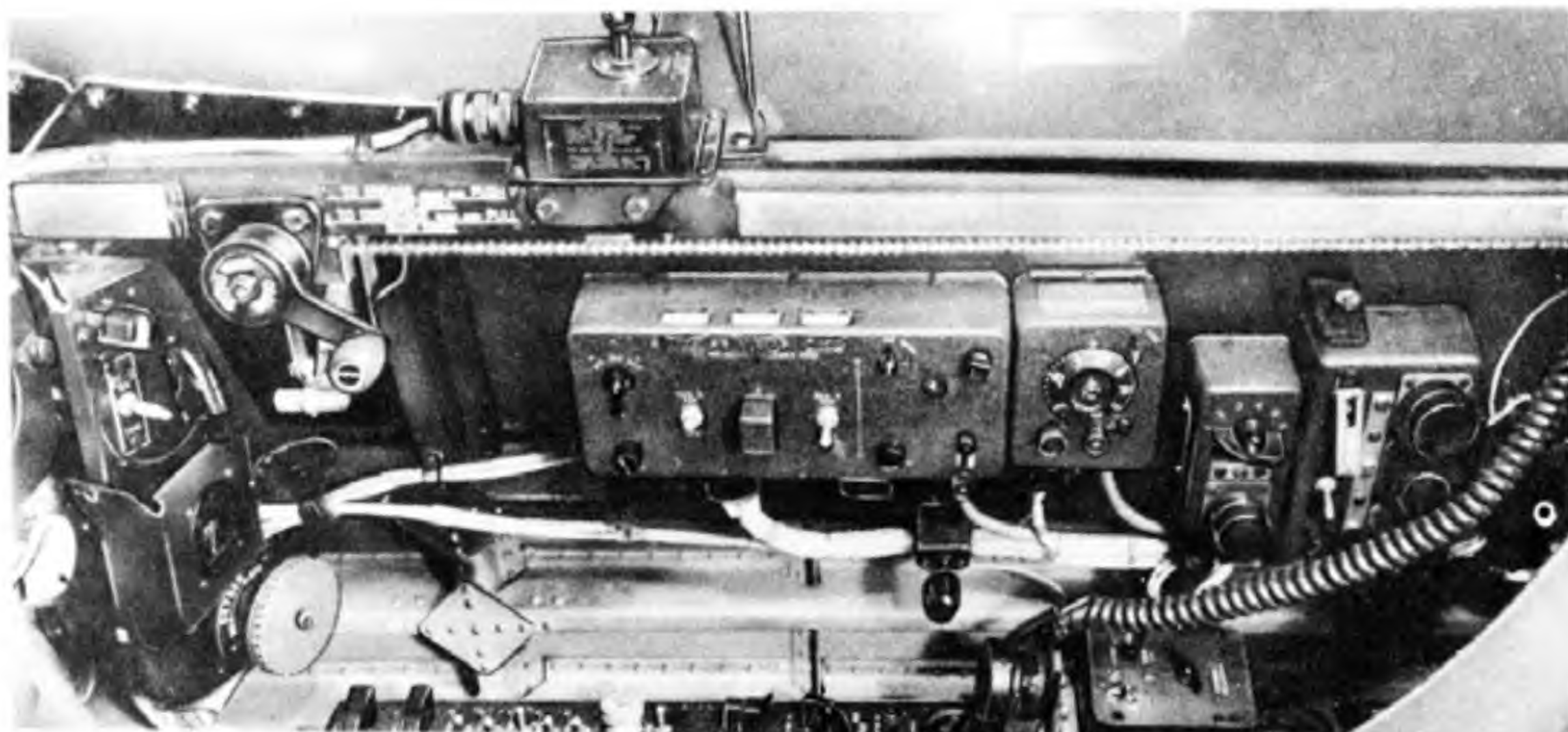
WARNING

The high ranges of the altimeter must never be used when flying at altitudes within the low range or when landing. The high range is not calibrated for such use and an accurate zero altitude indication would not be obtained.

(a) Turn the power switch, located on the indicator, to "ON".

(b) The limit switch SA-1/ARN-1 should be set at the desired altitude.

(c) True indication of altitude will be given by the indicator, ID-14/APN-1, consecutively over the low and high ranges. (The effective high range starts at the upper limit of the low range.) Some fluctuation may be noticed in the indicator reading when flying over rough or uneven terrain or when flying through bumpy air. At an altitude considerably above the upper limit of each range the indicator needle may be expected to fall back from its full position.



- | | |
|----------------------------------|------------------------------|
| 1. IFF Control Switches | 6. Control Unit (C-54/APX-1) |
| 2. Radio Master Switch | 7. Jack Box (J-22/ARC-5) |
| 3. Receiver Control (C-38/ARC-5) | 8. Hand Microphone Clip |
| 4. Range Receiver (C-26/ARC-5) | 9. VHF Control (C-45/ARC-1) |
| 5. Selector Unit (C-55/APX-1) | |

Figure 55—Pilot's Communicating Controls (F7F-3 Airplane)

(d) The limit indicator relieves the pilot of constant attention to the indicator scale. The indicator consists of three colored lamps, one for each of the three conditions of relay contact operation. The lamps are lighted as follows:

1. Red—indicates flight below the "pre-set altitude" (on Limit Switch).
2. White—indicates flight at approximately the "pre-set altitude".
3. Green—indicates flight above the "pre-set altitude".

b. **RADAR EQUIPMENT—MODEL F7F-1N AIRPLANE.**—AN/APS-6 radar equipment is installed in the nose of the fuselage behind a radome, and in the fuselage aft of Station 318. The indicator is installed on the main instrument panel, on the centerline; the main control C-46/APS-6 is installed on the right side of the cockpit forward of the communication controls. The auxiliary control, C-47/APS-6 is located on the left side of the cockpit outboard of the throttle.

(1) TO OPERATE (AN/APS-6).

(a) Before starting the equipment, be sure that controls are set in the following positions:

1. Main Control Unit on right side of pilot's cockpit:
 - a. RANGE NAUT. MILES switch to "OFF" position.
 - b. RADAR-BEACON switch to "RADAR" position.
 - c. TUNING control to "AUTOMATIC" position.

d. RECEIVER GAIN at center.

2. Auxiliary Control Unit on left side of cockpit, outboard of throttle:

- a. Set SEARCH, GUN-AIM switch to the "SEARCH" position.
- b. Set SEA-SUPPRESS control fully counterclockwise.

(b) STARTING EQUIPMENT.

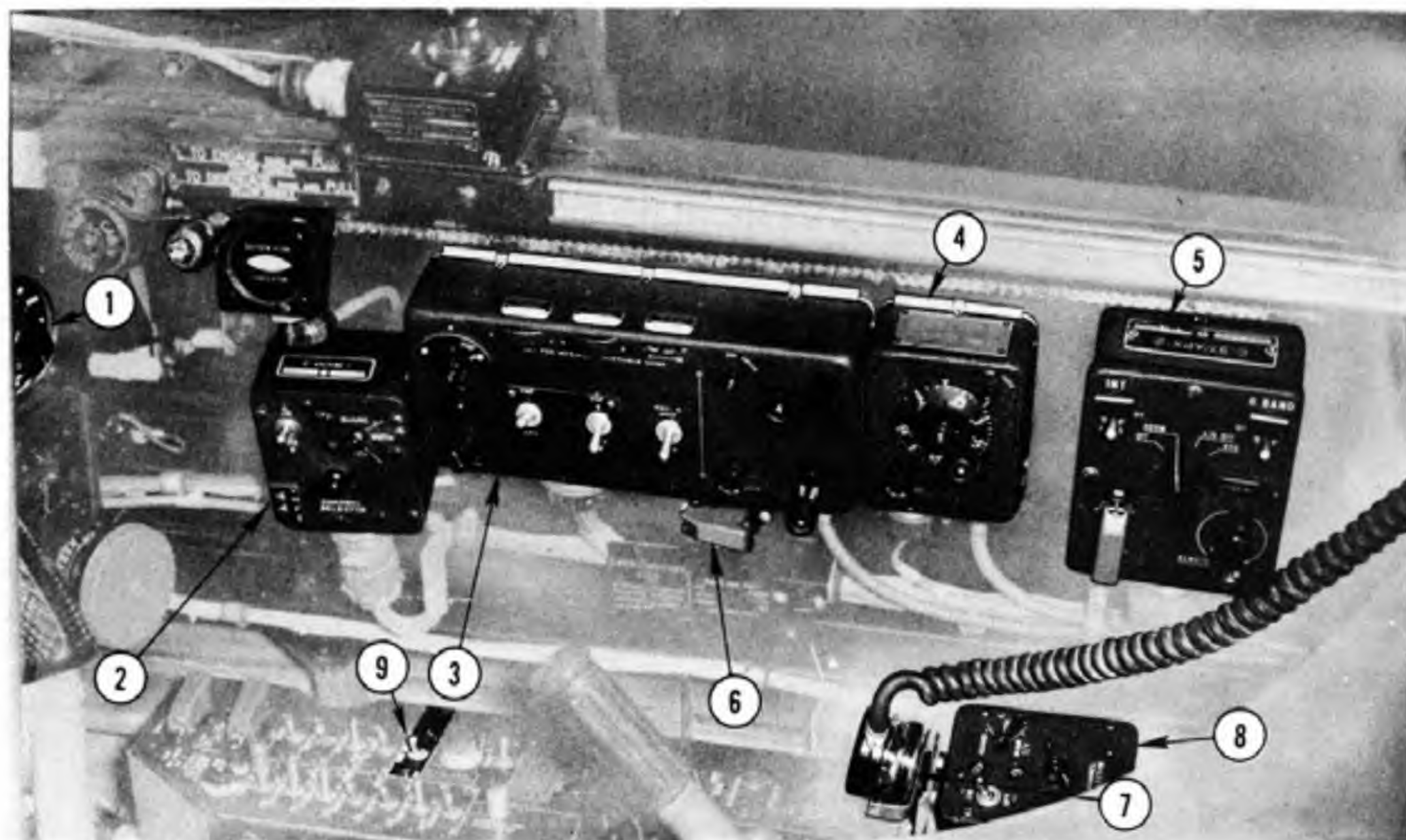
1. Turn the RANGE NAUT. MILES switch on the main control unit to the 5-mile range.
2. Allow a full uninterrupted three minute warm-up period.
3. Push the OPERATE-STAND-BY switch on the main control unit to the "OPERATE" position and hold for two seconds. Release the switch and it will return to its center position. The equipment is now in operation and signals should begin to appear on the indicator.

(c) STAND-BY OPERATION.

1. Push the OPERATE-STAND-BY switch to "STAND-BY", hold for two seconds, and release. By this operation the modulator is turned off, and the equipment may be started again by operating only the OPERATE-STAND-BY switch.

(d) TURNING OFF EQUIPMENT.

1. Set the SEARCH, GUN-AIM switch to "SEARCH" position.
2. Set the RADAR-BEACON switch to "RADAR" position.



- | | |
|---|-----------------------------------|
| 1. Radio Altimeter Switch (°SA-1A/ARN-1) | 6. Generator Transfer Switch |
| 2. VHF No. 2 Control (C-45/ARC-1) | 7. Hand Microphone |
| 3. Receiver Control (C-38/ARC-5 Modified C-330/ARC-5) | 8. VHF No. 1 Control (C-45/ARC-1) |
| 4. Range Receiver Control (C-26/ARC-5) | 9. Radio Master Switch |
| 5. IFF Control (C-57/APX-2) | |

Figure 55A—Pilot's Communicating Controls (F7F-3N Airplane)

3. Push OPERATE-STAND-BY switch to "STAND-BY" and release.

4. Turn RANGE NAUT. MILES switch to "OFF" position.

5. If TUNING control has been adjusted within "MANUAL" range, return to "AUTOMATIC".

c. COMMUNICATION EQUIPMENT—MODEL F7F-2N AIRPLANE.

(1) COMMUNICATING RADIO.—AN/ARC-5 and AN/ARC-1 receiving and transmitting equipment is installed in the fuselage between Stations 318 and 362.

The following controls are installed in the pilot's cockpit:

(a) RADIO MASTER SWITCH.—On top of electrical control panel.

(b) MASK MICROPHONE "PRESS - TO - TALK" SWITCH BUTTON.—On inboard (right engine) throttle handle.

(c) HAND MICROPHONE.—Stowed in clip on right side of cockpit.

(d) C-38/ARC-5 AND C-45/ARC-1 CONTROL UNITS.—On right side of cockpit.

The following controls are installed in the radar operator's cockpit:

(a) MASK MICROPHONE "PRESS - TO - TALK" SWITCH BUTTON.—On grip assembly mounted on left cockpit rail.

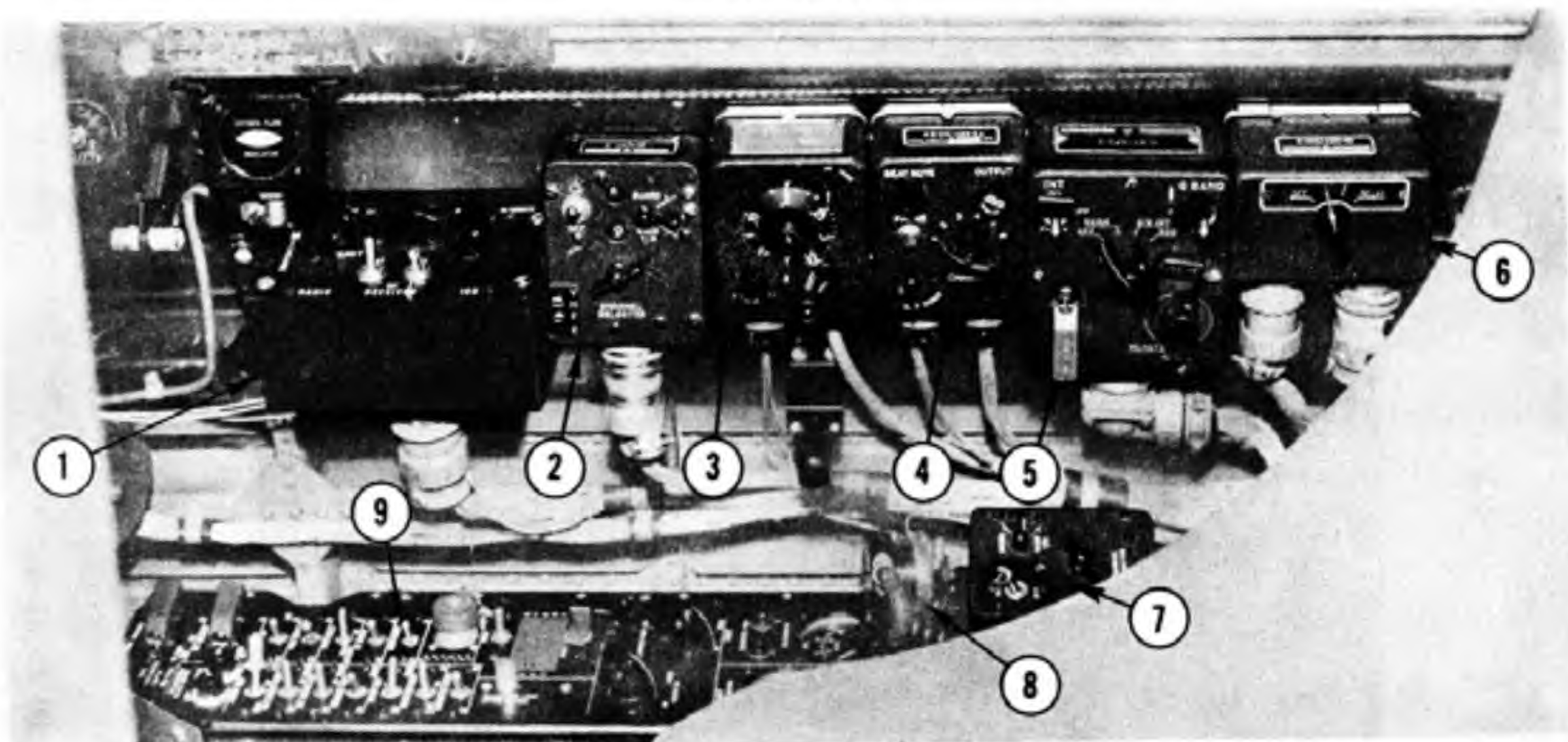
(b) HAND MICROPHONE.—Stowed in clip on main instrument panel.

(c) C-39/ARC-5 CONTROL UNIT.—On lower right side of main instrument panel.

(2) INTERPHONE.—An RL-7 ICS unit is installed in the bottom of the fuselage aft of sta. 318. The control switches are on the AN/ARC-5 control units.

(3) NAVIGATION RECEIVER.—An AN/ARR-2 receiver is installed in the fuselage with the AN/ARC-5 units; it is controlled by the communicating controls.

(4) FERRY RADIO.—An R-23/ARC-5 LF range receiver and associated tunable control C-26/ARC-5 is installed for ferrying use.



- | | |
|--|-------------------------------------|
| 1. Interphone Control Box (C-242/AIC-4) | 5. IFF Control (C-57/APX-2) |
| 2. VHF No. 2 Control (C-45/ARC-1) | 6. VHF Relay Control (C-333/ARC-28) |
| 3. Range Receiver Control (C-26/ARC-5) | 7. VHF No. 1 Control (C-45/ARC-1) |
| 4. Navigation Receiver Control (C-35/ARR-2A) | 8. Hand Microphone |
| | 9. Radio Master Switch |

Figure 55B—Pilot's Communicating Controls (F7F-4N Airplane)

(5) TACTICAL RADIO.

(a) In service, the tunable LF radio range receiver and associated control can be replaced by a lock-tuned HF receiver. To put this HF receiver into operation, the plug in the middle position in the receiver rack must be removed and replaced by the plug stowed on the aft side of Station 318 bulkhead, directly in front of the receiver rack.

This receiver is controlled by the REC "C" switch on the pilot's C-38/ARC-5 control unit. With this arrangement the C-26/ARC-5 control and associated cables are not used.

(b) Provision is made in the receiver rack for the installation of an additional lock tuned HF receiver. This additional receiver will be controlled by the REC "B" switch on the pilot's C-38/ARC-5 control unit—it will be necessary to remove the covers from the REC "B" toggle switch and sensitivity control directly above.

(6) OPERATION.

(a) Insert the microphone and headset plugs into the jacks and make sure that the plugs are completely engaged.

(b) Set battery switch and radio master switch (pilot's cockpit) to "ON".

(c) TRANSMISSION.

1. The position of the ICS-VHF-MHF microphone selector switch on the C-38/ARC-5 pilot's control unit will determine which component of the equipment will be used for transmission.

2. To operate the interphone system, set the

microphone selector switch to "ICS" position, press the microphone switch and talk.

3. To operate the MHF transmitter, set the microphone selector switch to "MHF", press the microphone switch and talk.

4. To transmit on VHF, set the microphone selector switch to "VHF", set the rotary switches on the C-45/ARC-1 control, (pilot's cockpit), as desired. Press the microphone switch and talk.

Note

The RT-18/ARC-1 equipment provides ten VHF channels and is so arranged that transmission and reception can be selected by the pilot on the C-45/ARC-1 as follows:

1

Position "MAIN T/R".—Transmission and reception on the selected one of the nine main channels.

2

Position "BOTH".—Transmission and reception on the selected one of the nine main channels and simultaneous monitoring of the GUARD channel.

3

Position "GUARD".—Transmission and reception on the GUARD channel.

The following instructions assume that the microphone selector switch on the pilot's C-38/ARC-5 control is set to "VHF" and that the REC "A" toggle switch is in the "UP" position.



1. Radar Auxiliary Control (C-47/APS-6) (F7F-1N only)
2. Indicator (ID-32/APS-6)
3. Radio Altimeter Indicator (ID-14B/APS-1)
4. Radio Altimeter Limit Lights

Figure 55C—Pilot's Radar Indicator and Controls (F7F-1N and F7F-2N Airplanes)

1

Position MAIN T/R.—Transmission and reception on the selected one of the nine main channels.

2

Position BOTH.—Transmission and reception on the selected one of the main channels and simultaneous monitoring on the GUARD channel.

3

Position GUARD.—Transmission and reception on the GUARD channel.

The following instructions assume that the microphone selector switch on the pilot's C-38/ARC-5 control is set to VHF and that the REC A toggle switch in the UP position.

1. To arrange the C-45/ARC-1 VHF control for transmission on any of the nine main channels, rotate the three-position switch to MAIN T/R, rotate the channel selector switch to any one of the nine channels desired, press the microphone switch, and talk.

2. Rotating the three-position switch to BOTH permits transmission and reception on any one of the selected main channels, and reception on the GUARD channel.

3. To arrange the C-45/ARC-1 control unit for transmission and reception on the GUARD channel, rotate the three-position selector switch to GUARD.

(d) RECEPTION.

1. GENERAL.—All receivers are always in the stand-by condition. Under normal conditions either or both of the REC A (VHF) or REC C (MHF) toggle switches on the pilot's C-38/ARC-5 control unit are set in the UP position.

2. HF RECEIVER.—Reception on MHF is controlled by the REC C toggle switch on the pilot's C-38/ARC-5 control unit.

Set the toggle switch "C" on the receiver control unit in the UP position and set the sensitivity control above switch "C", marked "SET FOR MAX. TOLERABLE NOISE". Make certain that the toggle switch "A" on the receiver control unit is in the OFF position, and that the OUTPUT control knob on the receiver control unit is in the minimum position while thus setting the level; however, unless sensitivity control is set for "MAX. TOLERABLE NOISE", weak signals may not be heard.

3. VHF RECEIVER.—Reception on VHF is controlled by the REC A toggle switch on the C-38/ARC-5 control unit, and by the selector switch on the C-45/ARC-1 control unit. Refer to transmission, paragraph (c) above for information on selecting any one of the ten channels provided. Set switch "A"

on the receiver control unit in the UP position, the toggle switch "C" in the OFF position, and reception will be obtained only on the VHF channel selected.

(6) IFF EQUIPMENT.—The AN/APX-1 transmitter receiver, RT-22/APX-1, is installed aft of Station 362. The control units, C-54 and C-55, are located at the right side of the cockpit on radio control panel. The "G" band switch and the Destruct switch are located on the lower right instrument panel.

(a) OPERATING INSTRUCTIONS.

1. TO START THE EQUIPMENT.—The toggle switch on control unit, C-54/APX-1, is thrown on.

2. TO CHANGE SELECTOR SWITCH POSITIONS.—On the selector unit, C-55/APX-1, rotate the rotary switch to the position designated by the Commanding Officer. Unless otherwise directed, this switch is set and left in position "1".

3. TO OPERATE THE "G"-BAND.—On the pilot's remote-switch panel throw the "G"-band switch to the ON position or flip it to the TIME position.

4. FOR DISTRESS OPERATION.—On the control unit, C-54/APX-1, lift the green EMERGENCY guard and throw the switch ON.

5. TO DESTROY THE RECEIVER-TRANSMITTER UNIT.—If possible, warn operating personnel to stand clear of the receiver-transmitter unit. On the pilot's remote-switch panel raise the red guard and throw the DESTRUCT switch to the ON position. This will explode all Type AN/MI destructors in the unit.

6. FURTHER OPERATING PROCEDURES.—Information on further operation procedures must be obtained from the Commanding Officer.

7. TO STOP THE EQUIPMENT.—On the control unit, C-54/APX-1, throw the toggle switch to the OFF position.

(b) ALTERNATE EQUIPMENT. — Control, wiring, and space provisions are made for the alternate installation of the ABA-1 IFF equipment.

f. COMMUNICATION EQUIPMENT— MODEL F7F-3N AIRPLANE.

(1) COMMUNICATING RADIO.—AN/ARC-5 receiving and AN/ARC-1 receiving and transmitting equipment is installed in the fuselage between Stations 318 and 362.

(a) The following controls are installed in the pilot's cockpit: (Refer to Figure 33.)

1. RADIO MASTER SWITCH.—On top of electrical control panel.

2. ICS-RADIO MICROPHONE SWITCH (A mask or lip microphone is normally used in this air-

plane)—On inboard (right engine) throttle handle.

3. C-26/ARC-5, Modified C-38/ARC-5 and two C-45/ARC-1 CONTROL UNITS.—On right side of cockpit.

Note

The BuAer originally intended to use the C-330/ARC-5 control unit in these airplanes. These controls, however, were not available at the time of installation. Therefore in to obtain microphone selector and audio control switches for the two AN/ARC-1 units (Dual ARC-1), the C-38/ARC-5 control was modified by the contractor. The modified C-38/ARC-5 unit is identical electrically to the BuAer C-330/ARC-5 unit. A nameplate reading "Modified to C-330/ARC-5" was added adjacent to the existing C-38/ARC-5 nameplate. The C-38/ARC-5 control will herein after be referred to as the *modified C-38/ARC-5* control.

(b) The following controls are installed in the radar operator's cockpit: (Refer to Figs. 58C and 59A).

1. Foot operated "PRESS-TO-TALK" MICROPHONE SWITCH.—Forward right side of cockpit.

2. C-39/ARC-5 CONTROL UNIT.—On lower left side of main instrument panel.

(2) INTERPHONE.—An RL-7 ICS unit is installed in the bottom of the fuselage aft of Station 318. The control switches are on the ARC-5 control units.

(3) NAVIGATION RECEIVER.—An ARR-2 receiver is installed in the fuselage with the ARC-5 units; it is controlled by the communicating controls.

(4) FERRY RADIO.—An R-23/ARC-5 LF range receiver and associated tunable control, C-26/ARC-5 is installed for ferrying use.

(5) ADDITIONAL RADIO EQUIPMENT.

(a) In service an additional lock-tuned HF receiver can be installed in the empty position on the receiver rack. This receiver is controlled by the Rec. C switch on the pilot's modified C-38/ARC-5 control unit.

(6) OPERATION.

(a) Insert the microphone and headset plugs into the jacks and make sure that they are completely engaged.

(b) Set battery switch and radio master switch (pilot's cockpit) to ON.

(c) TRANSMISSION.

1. The position of the ICS-Radio switch on the engine control quadrant and of the ICS-VHF #1 & #2 selector switches on the operator's C-39/ARC-5 control will determine transmission on either the inter-communicating system or VHF radio.

2. The position of the VHF #1 & #2 selector switches on the pilot's Modified C-38/ARC-5 control and of the ICS-VHF #1 & #2 selector switches on the operator's C-39/ARC-5 control will determine which VHF set is used.

Note

The "ON-OFF" switch on only one of the C-45/ARC-1 controls in the pilot's cockpit should be in the "ON" position. The VHF unit selected by these "ON-OFF" switches must be the same VHF unit set up as the VHF selector switches.

3. The C-45/ARC-1 control switches are operated as follows: for transmission and reception on any one of nine main channels use position "MAIN T/R"; for transmission and reception on any main channel and simultaneous reception on the GUARD channel use position "BOTH"; for transmission and reception on the GUARD channel use position "GUARD".

4. For the pilot to transmit on ICS, throw throttle switch to the ICS position and talk into microphone; to transmit on radio, select channel desired as described above, throw throttle switch to the RADIO position and talk.

5. For radar operator to transmit on ICS, rotate selector switch to ICS, press foot microphone switch and talk; to transmit on radio, rotate selector switch to the VHF set in use, press foot microphone switch and talk. The operator can transmit only on the VHF set and channel selected by the pilot.

6. To use hand held microphones with this system, it is necessary for the pilot to operate both the throttle microphone switch and the "PRESS-TO-TALK" switch on the microphone.

(d) RECEPTION.

1. All receivers are always in the stand-by condition.

2. The interphone (ICS) system will always take precedence over any other message being received.

3. For VHF radio, operate the switches on the pilot's modified C-38/ARC-5 and C-45/ARC-1 controls to select the desired VHF set and channel, as described under "TRANSMISSION." (c).

4. For HF radio (if installed) turn toggle switch Rec. C on the modified C-38/ARC-5 to the UP position and set for maximum tolerable noise. The navigation and range receiver outputs should be at minimum while this is being done.

5. For navigation receiver (R-4A/ARR-2) operate the crank on the pilot's modified C-38/ARC-5 until the assigned channel appears in the window. Set the NAV-VOICE selector switch to NAV. Set the OUTPUT control to produce a usable weak signal, or if the desired signal cannot be heard, to a fairly strong background hiss. Adjust the BEAT-NOTE control to produce a pleasing audible tone.

Readjust OUTPUT control to produce a usable weak signal. (If the signal is too strong, a clear-cut course indication cannot be obtained). At the completion of this check, turn the sensitivity to a minimum.

6. For Range Receiver, on the C-26/ARC-5 set the rotary switch on VOICE, advance the sensitivity control until normal background noise is heard, tune the desired radio range station and readjust the sensitivity control for normal operation.

7. For simultaneous reception on VHF and MHF turn the desired VHF switch and the Rec. C switch to the "UP" position.

8. The choice of receivers is not available to the operator, he hears only those selected by the pilot. The operator's volume may be adjusted with the control provided on the C-39/ARC-5.

(7) IFF EQUIPMENT.—The AN/APX-2 transmitter-receiver, RT-24A/APX-2, is installed aft of Station 362. The pilot's control unit, C-57/APX-2, is located on the right side of the cockpit. The radar

4. FOR INT OPERATION.—On the pilot operator's control unit, C-56/APX-2, is located at the bottom center of his instrument panel.

(a) OPERATING INSTRUCTIONS.

1. TO START THE EQUIPMENT.—On the pilot control unit C-57/APX-2 rotate the master control switch clockwise away from the OFF position and set it in the desired operating position.

2. TO CHANGE REPLY CODE.—On the operator control unit, C-56/APX-2 rotate the selector switch to the position designated by the Commanding Officer. Unless otherwise designated, this switch is set and left in position "1".

3. FOR G-BAND OPERATION. — On the pilot control unit throw the G-Band switch to the ON position or flip it to the "TIME" position. (See below.)

control unit throw the INT switch to the ON position or hold it momentarily in the PRESS position; or on the operator control unit hold the INT switch momentarily in the PRESS position. (See below.)

5. FOR DISTRESS OPERATION.—On the pilot control unit push the guard latch to the right (tilting it up) and rotate the master control switch to the EMERGENCY (extreme clockwise) position.

6. TO DESTROY THE RECEIVER TRANSMITTER UNIT.—If possible, warn operating personnel to stand clear of the receiver-transmitter unit. On the pilot control unit raise the red guard cover breaking the safety wire, and throw the DESTRUCT switch to the "ON" position. This will explode all Type AN/M1 destructors in the unit.

7. FURTHER OPERATING PROCEDURES.—Information on further operating procedures must be obtained from the Commanding Officer.

8. TO STOP THE EQUIPMENT.—On the

pilot control unit rotate the master switch to the extreme counterclockwise position, marked "OFF".

9. Guards have been installed over the G-Band and INT switches described above. These guards shall not be removed unless specific instructions to the contrary are issued.

(8) RADIO ALTIMETER. — The AN/APN-1 radio altimeter is installed in the fuselage radio compartment on the right side, aft of the ladder bracket. The antennas are installed on the underside of each wing inner panel. The indicator is on the right side of the pilot's instrument panel. The limit switch is on the pilot's lower right instrument panel. The low limit light indicator is installed on the left side of the pilot's instrument panel.

WARNING

The high ranges of the altimeter must never be used when flying at altitudes within the low range or when landing. The high range is not calibrated for such use and an accurate zero altitude indication would not be obtained.

TO OPERATE:

(a) Turn the power switch, located on the indicator, to "ON".

(b) The limit switch SA-1/ARN-1 should be set at the desired altitude.

(c) True indication of altitude will be given by the indicator, ID-14B/APN-1, consecutively over the low and high ranges. (The effective high range starts at the upper limit of the low range.) Some fluctuation may be noticed in the indicator reading when flying over rough or uneven terrain or when flying through bumpy air. At an altitude considerably above the upper limit of each range the indicator needle may be expected to fall back from its full position.

(d) The limit indicator relieves the pilot of constant attention to the indicator scale. The indicator consists of a red lamp which indicates flight below the "pre-set altitude" (on Limit Switch).

g. RADAR EQUIPMENT —MODEL F7F-3N AIRPLANE.—The F7F-3N airplane is equipped with an Army type SCR-720A or SCR-720C Radar System. All of the controls are located in the operator's cockpit. Both cockpit are provided with indicators.

For complete instructions for the use of this equipment refer to the "HANDBOOK OF OPERATING INSTRUCTIONS" (AN16-40SCR720-6) or to the F7F Erection and Maintenance Handbook (AN01-85FA-2).

**b. COMMUNICATION EQUIPMENT—
MODEL F7F-4N AIRPLANE.**

(1) COMMUNICATING RADIO.—AN/ARC-5 receiving and AN/ARC-1 receiving and transmitting

equipment is installed in the fuselage between Stations 318 and 362.

(a) The following controls are installed in the pilot's cockpit. Refer to Fig. 31A.

1. RADIO MASTER SWITCH.—On top of electrical control panel.

2. Circuit breakers for the individual Radio/Radar equipment are provided on the inboard aft face of the electrical control panel.

3. ICS—RADIO MICROPHONE SWITCH.—(A mask or lip microphone is normally used in this airplane)—On inboard (right engine) throttle handle.

Note

A J-193/AR jack box and a CX-922/AR extension cord set are installed on Sta. 203 bulkhead.

4. The C-242/AIC-4, C-333/ARC-28 and two C-45/ARC-1 Control units are installed on the right side.

(b) The following controls are installed in the radar operator's cockpit. Refer to Figs. 58D and 59B.

1. Foot operated "PRESS-TO-TALK" microphone switch—on forward right side of cockpit.

Note

A J-193/AR jack box and a CX-922/AR extension cord set are installed on operator's rear armor.

2. C-174/AIC-4 Control—on left side of forward instrument panel.

(c) Two RT-18/ARC-1 Transmitter-Receivers and an RE-51/ARC-28 relay unit are installed in the fuselage aft of Station 318.

(2) INTERPHONE.—An AM-40/AIC amplifier unit is installed in the lower part of the fuselage aft of Station 318. The controls are combined with the Communication Radio Controls.

(3) NAVIGATION RECEIVER. — An R-4A/ARR-2 receiver is installed in the fuselage adjacent to the radio range receiver. The C-35/ARR-2A control is in the pilot's cockpit adjacent to the other radio controls.

(4) RANGE RECEIVER.—An R-23/ARC-5 radio range receiver is installed in the top part of the fuselage aft of Sta. 318. The C-26/ARC-5 tuning control is installed on the right side of the pilot's cockpit adjacent to the other radio controls.

(5) FUNCTION OF C-172/AIC-4 PILOT'S CONTROL AND OF C-174/AIC-4 OPERATOR'S CONTROL.

(a) When the NORMAL-ALTERNATE selector switch on the C-242/AIC-4 pilot's control is in the NORMAL position all audio outputs (Both ARC-1's, the R-23/ARC-5 and the R-4A/ARR-2 receivers) are applied to the interphone amplifier. The pilot alone will hear the R-23/ARC-5 and the R-4A/ARR-2 re-

ceivers. Both the pilot and the operator will hear the output of either ARC-1 set.

(b) The NORMAL-ALTERNATE selector switch on the C-242/AIC-4 control is always in the NORMAL position except when the interphone amplifier becomes inoperative, at which time the switch is placed in the ALTERNATE (EMERGENCY) position. This will cause all audio output, at reduced levels, to be heard by both the pilot and the operator. The pilot and the operator will be unable to communicate with each other. However, if the selector switch is inadvertently placed in the ALTERNATE position when the AM-40/AIC is operating, the pilot can call the operator but the operator can not answer.

(c) The radio volume controls on the C-242/AIC-4 pilot's control and the C-174/AIC-4 operator's control affect only the output of the ARC-1 receivers.

(d) The ICS-VHF-HF microphone selector switch HF sensitivity control and the HF receiver switch on the C-242/AIC-4 pilot's control are inoperative in this airplane.

(e) The receiver selector switch on the C-174/AIC-4 operator's control is inoperative in this airplane.

(6) OPERATION.

(a) Insert the microphone and headset plugs into the jacks and make sure that they are completely engaged.

(b) Set battery switch and radio master switch (pilot's cockpit) to ON. Make certain that the circuit breakers are not tripped.

(c) TRANSMISSION.

1. The position of the ICS-RADIO switch on the engine control quadrant and the position of the ICS-VHF switch on the operator's C-174/AIC-4 control will determine transmission on either the intercommunicating system or VHF radio.

2. The position of the selector switch on the C-333/ARC-28 pilot's control will determine which VHF set is used for transmission.

CAUTION

Do not use the "RELAY" position on the C-333/ARC-28 unless specific instructions to do so have been issued.

3. The C-45/ARC-1 control switches are operated as follows: for transmission and reception on any one of nine main channels use position "MAIN T/R"; for transmission and reception on any main channel and simultaneous reception on the GUARD channel use position "BOTH"; for transmission and reception on the GUARD channel use position "GUARD".

4. For the pilot to transmit on ICS, throw throttle switch to the ICS position and talk into microphone; to transmit on radio, select channel desired as described above, throw throttle switch to the RADIO position and talk.

5. For radar operator to transmit on ICS, rotate selector to ICS, press foot microphone switch and talk; to transmit on radio, rotate selector switch to VHF, press foot microphone switch and talk. The operator can transmit only on the VHF set and channel selected by the pilot.

(d) RECEPTION.

1. The range and the navigation receivers are always in the stand-by condition and can be heard by advancing the sensitivity controls on the associated control.

2. The interphone (ICS) system will always take precedence over any other message being received.

3. For VHF radio, operate the selector switches on the C-333/ARC-28 and on the C-45/ARC-1 controls as desired.

4. For navigation receiver (R-4A/ARR-2) operate the crank on the pilot's C-35/ARR-2A until the assigned channel appears in the window. Set the NAV-VOICE selector switch to NAV. Set the OUTPUT control to produce a usable weak signal, or if the desired signal can not be heard, to a fairly strong background hiss. Adjust the BEAT-NOTE control to produce a pleasing audible tone. Readjust OUTPUT control to produce a usable weak signal. (If the signal is too strong, a clear-cut course indication can not be obtained.)

5. For Range Receiver, on the C-26/ARC-5 set the rotary switch on VOICE, advance the sensitivity control until normal background noise is heard, tune the desired radio range station and readjust the sensitivity control for normal operation.

(e) RELAY.

1. The ARC-28 equipment permits use of the two AN/ARC-1 units as an automatic radio relay system. (SYSTEM "A") to provide long range VHF communication.

2. Rotate the selector switch on the C-333/ARC-28 control "RELAY" position, then rotate the channel selector switches on the two C-45/ARC-1 controls to the two channels selected for relay operation. The equipment will now operate automatically. To insure proper operation the system should be monitored.

3. No local transmitter-receiver control is provided in the "RELAY" position. In order to transmit from the airplane the selector switch must be moved from "RELAY" to either VHF #1 or VHF #2.

(7) IFF EQUIPMENT.—The AN/APX-2 transmitter-receiver, RT-24A/APX-2, is installed aft of Sta. 362. The pilot's control unit, C-57/APX-2 is located on the right side of the cockpit. The radar operator's control unit, C-56/APX-2, is located on the right side of his cockpit.

(a) OPERATING INSTRUCTIONS.

1. TO START THE EQUIPMENT.—On the

pilot control unit C-57/APX-2 rotate the master control switch clockwise away from the OFF position and set it in the desired operating position.

2. TO CHANGE REPLY CODE.—On the operator control unit, C-56/APX-2, rotate the selector switch to the position designated by the Commanding Officer. Unless otherwise designated, this switch is set and left in position "1".

3. FOR G-BAND OPERATION. — On the pilot control unit flip the G-Band switch down to the TIME position. (See below.)

4. FOR INT OPERATION.—On the pilot control unit hold the INT switch down momentarily in the PRESS position; or on the operator's control unit hold the INT switch momentarily in the PRESS position.

5. FOR DISTRESS OPERATION.—On the pilot control unit push the guard latch to the right (tilting it up) and rotate the master control switch to the EMERGENCY (extreme clockwise) position.

6. TO DESTROY THE TRANSMITTER-RECEIVER UNIT.—If possible, warn operating personnel to stand clear of the transmitter-receiver unit. On the pilot control unit raise the red guard cover, breaking the safety wire, and throw the DESTRUCT switch to the ON position. This will explode all Type AN/M1 destructors in the unit.

7. FURTHER OPERATING PROCEDURES. —Information on further operating procedures must be obtained from the Commanding Officer.

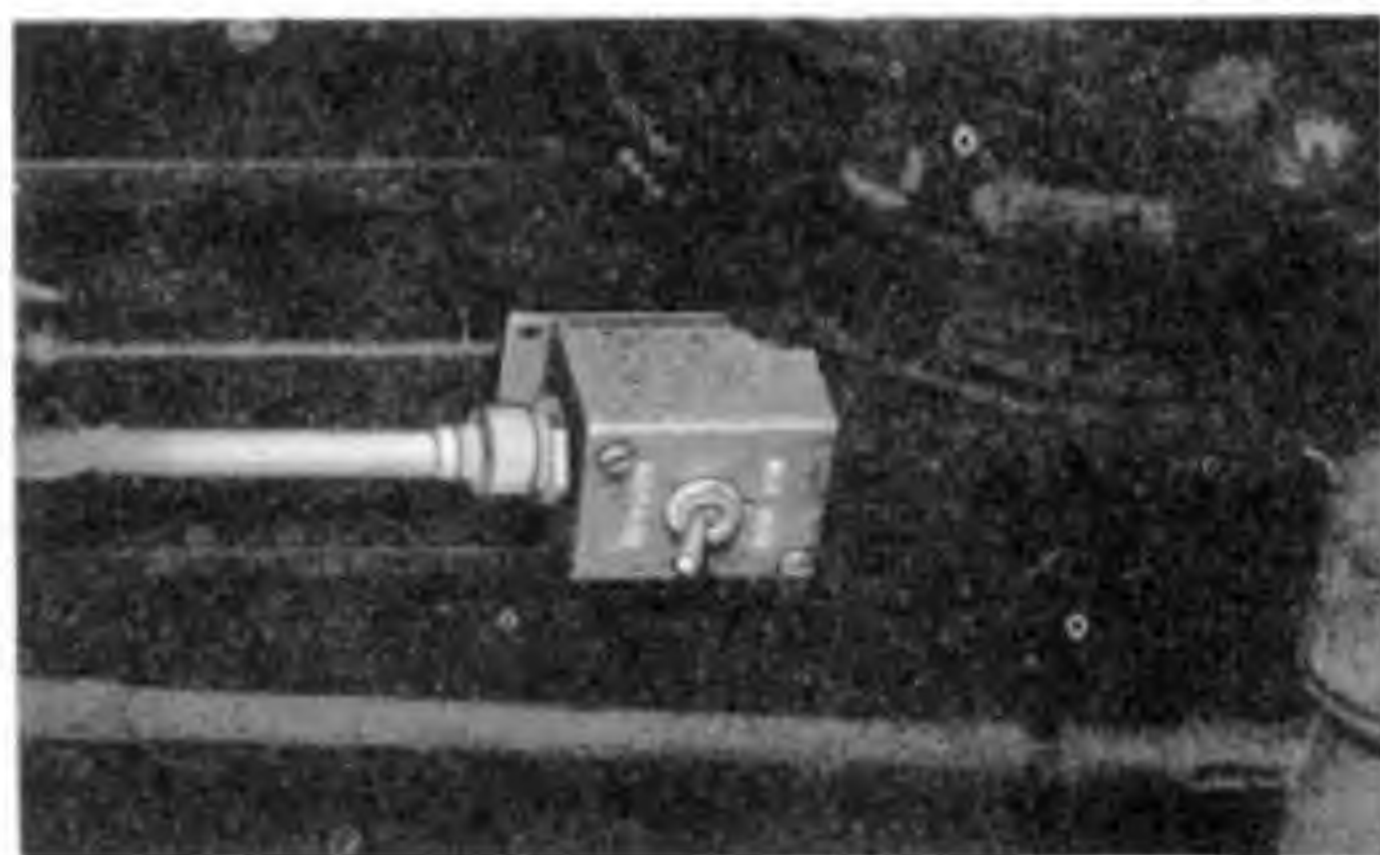
8. TO STOP THE EQUIPMENT.—On the pilot control unit rotate the master control switch to the extreme counterclockwise position, marked OFF.

9. Guards have been installed over the G-Band and INT switches described above to prevent them being placed in the ON (up) position. These guards shall not be removed unless specific instructions to the contrary are issued.

(8) RADIO ALTIMETER. — The AN/APN-1 radio altimeter is installed in the fuselage radio compartment on the right side, aft of the ladder bracket. The antennas are installed on the underside of each wing inner panel. The indicator is on the right side of the pilot's instrument panel. The limit switch is on the pilot's lower right instrument panel. The limit light indicator is installed on the right side of the pilot's instrument panel. A repeat indicator is installed in the radar operator's cockpit, on the instrument panel. (See Note 2 below).

WARNING

The high ranges of the altimeter must never be used when flying at altitudes within the low range or when landing. The high range is not calibrated for such use and an accurate zero altitude indication would not be obtained.



**Figure 55D—Radar Auxiliary Control
(SA-38/APA-32) (F7F-2N Only)**

1. To arrange the C-45/ARC-1 VHF control for transmission on any one of the nine main channels, rotate the three-position switch to "MAIN T/R", rotate the channel selector switch to the channel desired, press the microphone switch and talk.

2. Rotating the three-position switch to "BOTH" permits transmission and reception on any one of the selected main channels, and reception on the GUARD channel.

3. To arrange the C-45/ARC-1 control unit for transmission and reception on the GUARD channel, rotate the three-position selector switch to "GUARD".

(d) RECEPTION.

1. GENERAL.—All receivers are always in the stand-by condition. The pilot only can select reception. Under normal conditions either or both of the REC "A" (VHF) or REC "C" (MHF) toggle switches on the pilot's C-38/ARC-5 control unit are set in the "UP" position.

2. INTERPHONE.—The interphone (ICS) system will always take precedence over any other message being received.

3. HF RECEIVER.—Reception on MHF is controlled by the REC "C" toggle switch on the pilot's C-38/ARC-5 control unit.

Set the toggle switch "C" on the receiver control unit in the "UP" position and set the sensitivity control above switch "C", marked "SET FOR MAX. TOLERABLE NOISE". Make certain that the toggle switch "A" on the receiver control unit is in the "OFF" position, and that the OUTPUT control knob on the receiver control unit is in the minimum position while thus setting the level; however, unless sensitivity control is set for "MAX. TOLERABLE NOISE", weak signals may not be heard.

4. VHF RECEIVER.—Reception on VHF is controlled by the REC "A" toggle switch on the C-38/ARC-5 control unit, and by the selector switch on the C-45/ARC-1 control unit, in the pilot's cockpit.

Refer to paragraph (c) TRANSMISSION (above) for information on selecting any one of the ten channels provided. Set switch "A" on the receiver control unit in the "UP" position, the toggle switch "C" in the "OFF" position, and reception will be obtained only on the VHF channel selected.

(e) JOINT OPERATION.

1. The C-39/ARC-5 radar operator's radio control is equipped with a three-position microphone selector switch identical in function to the similar switch on the pilot's C-38/ARC-5 control. Each switch is independent of the other. The following operations permit the radar operator to transmit or receive:

a. Transmission on a VHF channel selected by the pilot; rotate the microphone selector switch to "VHF", press the microphone switch, and talk.

b. Transmission on HF (independent of the pilot); rotate the microphone selector switch to "HF", press the microphone switch and talk.

c. Transmission on ICS; rotate the microphone selector switch to "ICS", press the microphone switch and talk.

d. Reception; the choice of reception is available only to the pilot—the radar operator will hear only on those channels selected by the pilot. The radar operator can adjust volume as he chooses.

(7) IFF EQUIPMENT.—The AN/APX-2 transmitter-receiver, RT-24/APX-2, is installed aft of station 362. The pilot's control unit, C-57/APX-2 is located on the hydraulic control panel on the right side of the cockpit. The radar operator's control unit, C-56/APX-2, is located at the bottom center of his instrument panel.

(a) OPERATING INSTRUCTIONS.

1. TO START THE EQUIPMENT.—On the pilot control unit C-57/APX-2 rotate the master control switch clockwise away from the "OFF" position and set it in the desired operating position.

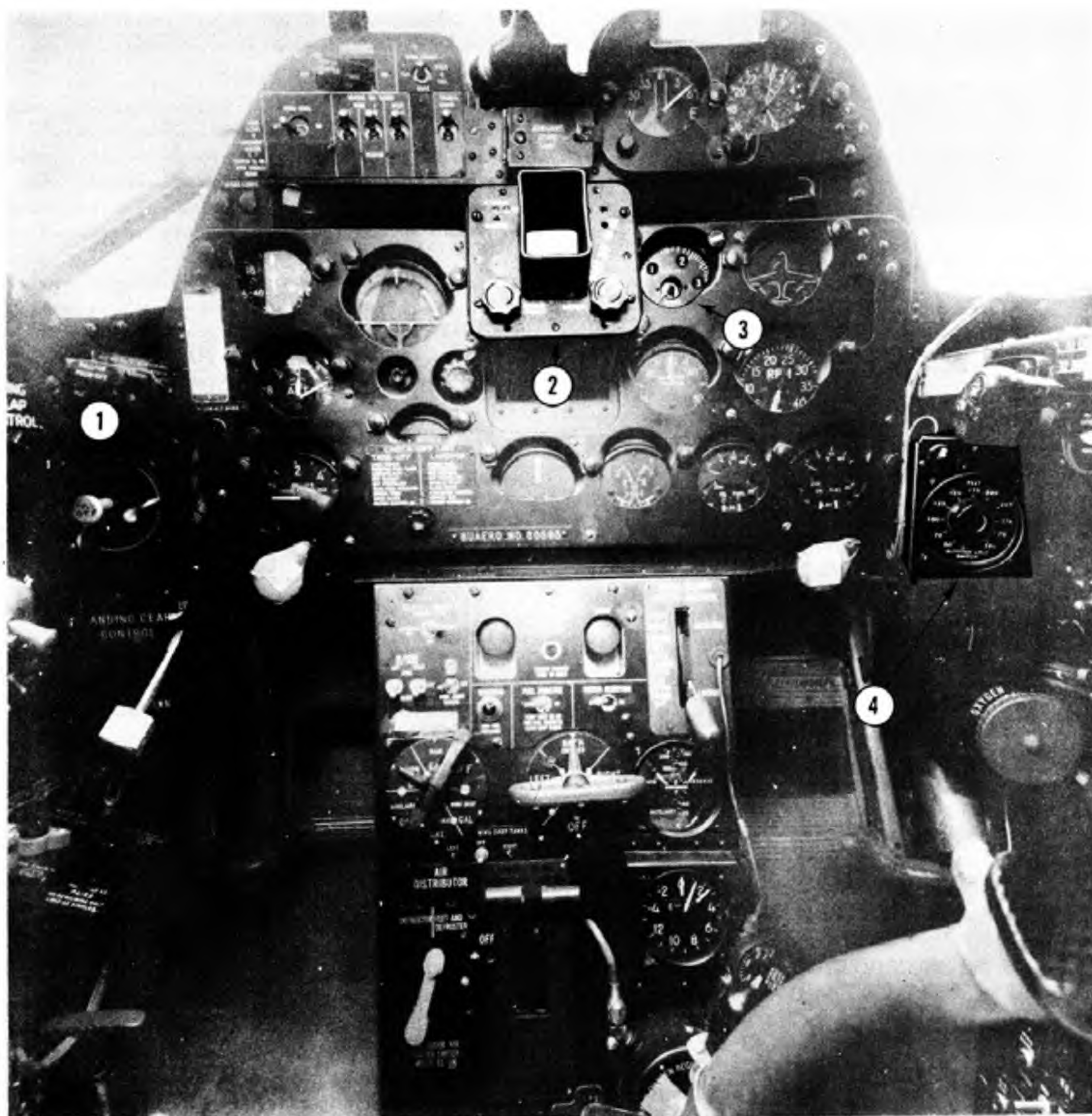
2. TO CHANGE CODE

—On the operator control unit, C-56/APX-2, rotate the code selector switch to the position designated by the commanding officer. Unless otherwise designated, this switch is set and left in position "1".

3. FOR G-BAND OPERATION. — On the pilot control unit throw the G-Band switch to the "ON" position or flip it to the "TIME" position.

4. FOR INT OPERATION.—On the pilot control unit throw the INT switch to the "ON" position or hold it momentarily in the "PRESS" position. The intensity of the response, which is displayed on the radar indicator, is set by the GAIN control on the pilot control unit.

5. FOR DISTRESS OPERATION.—On the pilot control unit push the guard latch to the right (tilting it up) and rotate the master control switch to the "EMERGENCY" (extreme clockwise) position.



1. Radio Altimeter Limit Lights
2. Radar Repeat Indicator (BC-1152-A)
3. Radio Altimeter Indicator (ID-14B/APN-1)
4. Radio Altimeter Limit Switch (*SA-1A/ARN-1)

Figure 55E—Pilot's Indicator and Controls (F7F-3N Airplanes)

6. TO DESTROY THE RECEIVER-TRANSMITTER UNIT.—If possible, warn operating personnel to stand clear of the receiver-transmitter unit. On the pilot control unit raise the red guard cover breaking the safety wire, and throw the DESTRUCT switch to the "ON" position. This will explode all Type AN/M-1 Destructors in the unit.

7. FURTHER OPERATING PROCEDURES.—Information on further operating procedures must be obtained from the commanding officer.

8. TO STOP THE EQUIPMENT. — On the pilot control unit rotate the master control switch to the extreme counterclockwise position, marked "OFF".

(8) RADIO ALTIMETER. — The AN/APN-1 radio altimeter is installed in the fuselage radio compartment on the right side, aft of the ladder bracket. The antennae are installed on the underside of each wing inner panel. The indicator and the limit indicator lights are on the right side of the pilot's instrument panel. The limit switch is on the pilot's lower right instrument panel.

WARNING

The high ranges of the altimeter must never be used when flying at altitudes within the low range or when landing. The high range is not calibrated for such use and an accurate zero altitude indication would not be obtained.

(a) Turn the power switch, located on the indicator, to "ON".

(b) The limit switch SA-1/ARN-1 should be set at the desired altitude.

(c) True indication of altitude will be given by the indicator, ID-14/APN-1, consecutively over the low and high ranges. (The effective high range starts at the upper limit of the low range.) Some fluctuation may be noticed in the indicator reading when flying over rough or uneven terrain or when flying through bumpy air. At an altitude considerably above the upper limit of each range the indicator needle may be expected to fall back to zero.

(d) The limit indicator relieves the pilot of constant attention to the indicator scale. The indicator consists of three colored lamps, one for each of the three conditions of relay contact operation. The lamps are lighted as follows:

1. Red—indicates flight below the "pre-set altitude" (on Limit Switch).
2. White—indicates flight at approximately the "pre-set altitude".
3. Green—indicates flight above the "pre-set altitude".

d. RADAR EQUIPMENT—MODEL F7F-2N AIRPLANE.—AN/APA-32 and AN/APS-6 radar equipment is installed in the nose of the fuselage behind a radome, and in the fuselage aft of Station 318.

The pilot's indicator is installed on the centerline of his main instrument panel; the pilot's switch box, SA-38/APA-32, is located on the left side of the cockpit, outboard of the throttle.

The radar operator's indicator is installed on the centerline of his instrument panel; the radar main control, C-46/APS-6, is located on the lower left side of his instrument panel; his auxiliary control, C-47/APS-6, is outboard (to the left) of the main control.

(1) TO OPERATE (AN/APS-6 and AN/APA-32).

(a) In this installation the REPEAT INDICATOR UNIT, AN/APA-32, provides a means of operating two indicators, one for the pilot and one for the radar operator. The main control unit is located in the radar operator's cockpit, and the normal auxiliary control is used by the radar operator. The pilot's switch box replaces the pilot auxiliary control unit and contains only a SEARCH-GUN AIM switch, which permits the pilot to select operation of the equipment on "GUN AIM" or "SEARCH". The radar operator controls the radar and beacon search operation.

(b) Follow the same procedure given in Section V, Paragraph 3.b.(1)(b).

Note

1

Reliable operation of the VHF and navigation equipment is generally confined to approximately line-of-sight distance as determined by height of the transmitting and receiving antennae, but since transmission at these frequencies depends on meteorological conditions, large deviations from the line of sight distance may occur. HF communication for ranges over approximately 40 miles depends on sky-wave transmission and the results depend on the frequency, time of day, the season and the other factors, rather than transmitter and receiver heights.

2

The curve (figure 56) indicates the normal distance range of VHF communications when one antenna is at sea level and there are no intervening obstructions. Under favorable conditions the range, in nautical miles, will be equal to the indicated statute mile range.

e. COMMUNICATION EQUIPMENT — MODEL F7F-3 AIRPLANE.

(1) COMMUNICATING RADIO.—AN/ARC-5 and AN/ARC-1 receiving and transmitting equipment is installed in the fuselage between Stations 318 and 362.

The following controls are installed in the pilot's cockpit:

(a) RADIO MASTER SWITCH.—On top of electrical control panel.

(b) MASK MICROPHONE "PRESS - TO - TALK" SWITCH BUTTON.—On inboard (right engine) throttle handle.

(c) HAND MICROPHONE.—Stowed in clip on right side of cockpit.

(d) C-38/ARC-5 AND C-45/ARC-1 RECEIVER CONTROL UNITS.—On right side of cockpit.

(2) NAVIGATION RECEIVER.—An AN/ARR-2 receiver is installed in the fuselage with the AN/ARC-5 unit; it is controlled by the communicating controls.

(3) FERRY RADIO.—An R-23/ARC-5 LF range receiver and associated tunable control C-26/ARC-5 is installed for ferrying use.

(4) TACTICAL RADIO.

(a) In service, the tunable LF radio range receiver and associated control can be replaced by a lock-tuned HF receiver. To put this HF receiver into operation, the plug in the middle position in the receiver rack must be removed and replaced by the plug stowed on the aft side of Station 318 bulkhead, directly in front of the receiver rack.

This receiver is controlled by the REC "C" switch on the pilot's C-38/ARC-5 control unit. With this arrangement the C-26/ARC-5 control and associated cables are not used.

(b) Provision is made in the receiver rack for the installation of an additional lock-tuned HF receiver. This additional receiver will be controlled by the REC "B" switch on the pilot's C-38/ARC-5 control unit—it will be necessary to remove the covers from the REC "B" toggle switch and sensitivity control directly above.

(5) OPERATION.

(a) Insert the microphone and headset plugs into the jacks and make sure that the plugs are completely engaged.

(b) Set battery switch and radio master switch (pilot's cockpit) to "ON".

(c) TRANSMISSION.

1. The position of the VHF-MHF microphone selector switch on the C-38/ARC-5 pilot's control unit will determine which component of the equipment will be used for transmission.

2. To operate the MHF transmitter, set the

microphone selector switch to "MHF", press the microphone switch, and talk.

3. To transmit on VHF, set the microphone selector switch to "VHF", set the rotary switches on the C-45/ARC-1 control as desired. Press the microphone switch and talk.

Note

The RT-18/ARC-1 equipment provides ten VHF channels and is so arranged that transmission and reception can be selected by the pilot on the C-45/ARC-1 as follows:

1

Position "MAIN T/R".—Transmission and reception on the selected one of the nine main channels.

2

Position "BOTH".—Transmission and reception on the selected one of the main channels and simultaneous monitoring on the GUARD channel.

3

Position "GUARD".—Transmission and reception on the GUARD channel.

The following instructions assume that the microphone selector switch on the pilot's C-38/ARC-5 control is set to "VHF" and that the REC "A" toggle switch is in the "UP" position.

1. To arrange the C-45/ARC-1 VHF control for transmission on any of the nine main channels, rotate the three-position switch to "MAIN T/R", rotate the channel selector switch to any one of the nine channels desired, press the microphone switch, and talk.

2. Rotating the three-position switch to "BOTH" permits transmission and reception on any one of the selected main channels, and reception on the GUARD channel.

3. To arrange the C-45/ARC-1 control unit for transmission and reception on the GUARD channel, rotate the three-position selector switch to "GUARD".

(d) RECEPTION.

1. GENERAL.—All receivers are always in the stand-by condition. Under normal conditions either or both of the REC "A" (VHF) or REC "C" (MHF) toggle switches on the pilot's C-38/ARC-5 control unit are set in the "UP" position.

2. HF RECEIVER.—Reception on MHF is controlled by the REC "C" toggle switch on the pilot's C-38/ARC-5 control unit.

Set the toggle switch "C" on the receiver control unit in the "UP" position and set the sensitivity control above switch "C", marked "SET FOR MAX. TOLERABLE NOISE". Make certain that the toggle switch "A" on the receiver control unit is in the "OFF" position, and that the OUTPUT control

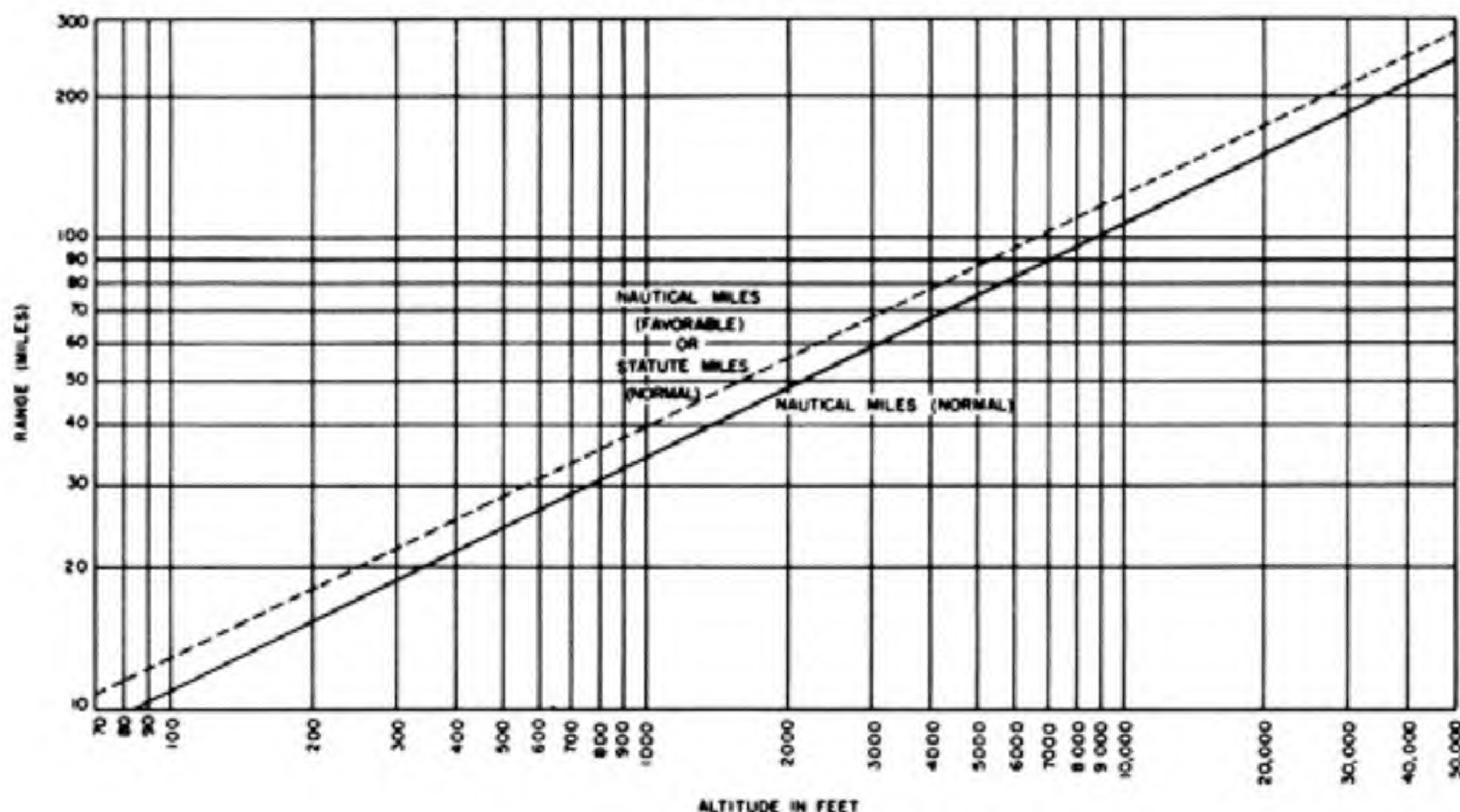


Figure 56—VHF Range vs. Altitude

knob on the receiver control unit is in the minimum position while thus setting the level; however, unless sensitivity control is set for "MAX. TOLERABLE NOISE", weak signals may not be heard.

3. VHF RECEIVER.—Reception on VHF is controlled by the REC "A" toggle switch on the C-38/ARC-5 control unit, and by the selector switch on the C-45/ARC-1 control unit. Refer to TRANSMISSION, paragraph (c) above for information on selecting any one of the ten channels provided. Set switch "A" on the receiver control unit in the "UP" position, the toggle switch "C" in the "OFF" position, and reception will be obtained only on the VHF channel selected.

(6) IFF EQUIPMENT.—The AN/APX-1 transmitter receiver, RT-22/APX-1, is installed aft of Station 362. The control units, C-54 and C-55, are located at the right side of the cockpit on the radio control panel. The "G" band switch and the DESTRUCT switch are located on the lower right instrument panel.

(a) OPERATING INSTRUCTIONS.

1. TO START THE EQUIPMENT. — The toggle switch on control unit, C-54/APX-1, is thrown "ON".

2. TO CHANGE SELECTOR SWITCH POSITIONS.—On the selector unit, C-55/APX-1, rotate the rotary switch to the position designated by the commanding officer. Unless otherwise directed, this switch is set and left in position "1".

3. TO OPERATE THE "G"-BAND.—On the pilot's remote-switch panel throw the "G"-band switch to the "ON" position or flip it to the "TIME" position.

4. FOR DISTRESS OPERATION.—On the control unit, C-54/APX-1, lift the green EMERGENCY guard and throw the switch "ON".

5. TO DESTROY THE RECEIVER-TRANSMITTER UNIT.—If possible, warn radar operator. On the pilot's remote-switch panel raise the red guard and throw the DESTRUCT switch to the "ON" position. This will explode all Type AN/M-1 destructors in the unit.

6. FURTHER OPERATING PROCEDURES.—Information on further operating procedures must be obtained from the commanding officer.

7. TO STOP THE EQUIPMENT.—On the control unit, C-54/APX-1, throw the toggle switch to the "OFF" position.

f. COMMUNICATION EQUIPMENT—
MODEL F7F-3N AIRPLANE.

(1) COMMUNICATING RADIO.—AN/ARC-5 receiving and AN/ARC-1 receiving and transmitting equipment is installed in the fuselage between stations 318 and 362.

(a) The following controls are installed in the pilot's cockpit. (Refer to figure 33.)

1. RADIO MASTER SWITCH.—On top of electrical control panel.

2. ICS-RADIO MICROPHONE SWITCH (A mask or lip microphone is normally used in this airplane)—On inboard (right engine) throttle handle.

3. C-26/ARC-5, modified C-38/ARC-5 and two C-45/ARC-1 CONTROL UNITS.—On right side of cockpit.

Note

The BuAer originally intended to use the C-330/ARC-5 control unit in these airplanes. These controls, however, were not available at the time of installation. Therefore, to obtain microphone selector and audio control switches for the two AN/ARC-1 units (Dual ARC-1), the C-38/ARC-5 control was modified by the contractor. The modified C-38/ARC-5 unit is identical electrically to the BuAer C-330/ARC-5 unit. A nameplate reading "Modified to C-330/ARC-5" was added adjacent to the existing C-38/ARC-5 nameplate. The C-38/ARC-5 control will hereinafter be referred to as the *modified C-38/ARC-5 control*.

(b) The following controls are installed in the radar operator's cockpit: (Refer to figs. 58C and 59A).

1. Foot operated "PRESS-TO-TALK" MICROPHONE SWITCH.—Forward right side of cockpit.

2. C-39/ARC-5 CONTROL UNIT. — On lower left side of main instrument panel.

(2) INTERPHONE.—An RL-7 ICS unit is installed in the bottom of the fuselage aft of station 318. The control switches are on the AN/ARC-5 control units.

(3) NAVIGATION RECEIVER.—An AN/ARR-2 receiver is installed in the fuselage with the AN/ARC-5 units; it is controlled by the communicating controls.

(4) FERRY RADIO.—An R-23/ARC-5 LF range receiver and associated tunable control, C-26/ARC-5 is installed for ferrying use.

(5) ADDITIONAL RADIO EQUIPMENT.

(a) In service an additional lock-tuned HF receiver can be installed in the empty position on the receiver rack. This receiver is controlled by the REC. "C" switch on the pilot's modified C-38/ARC-5 control unit.

(6) OPERATION.

(a) Insert the microphone and headset plugs into the jacks and make sure that they are completely engaged.

(b) Set battery switch and radio master switch (pilot's cockpit) to "ON".

(c) TRANSMISSION.

1. The position of the ICS-Radio switch on the engine control quadrant and of the ICS-VHF no. 1 and no. 2 selector switches on the operator's C-39/ARC-5 control will determine transmission on either the inter-communicating system or VHF radio.

2. The position of the VHF no. 1 and no. 2 selector switches on the pilot's modified C-38/ARC-5 control and of the ICS-VHF no. 1 and no. 2 selector

switches on the operator's C-39/ARC-5 control will determine which VHF set is used.

Note

The ON-OFF switch on only one of the C-45/ARC-1 controls in the pilot's cockpit should be in the "ON" position. The VHF unit selected by these ON-OFF switches must be the same VHF unit set up as the VHF selector switches.

3. The C-45/ARC-1 control switches are operated as follows: for transmission and reception on any one of nine main channels use position "MAIN T/R"; for transmission and reception on any main channel and simultaneous reception on the GUARD channel use position "BOTH"; for transmission and reception on the GUARD channel use position "GUARD".

4. For the pilot to transmit on ICS, throw throttle switch to the "ICS" position and talk into microphone; to transmit on radio, select channel desired as described above, throw throttle switch to the "RADIO" position and talk.

5. For radar operator to transmit on ICS, rotate selector switch to "ICS", press foot microphone switch and talk; to transmit on radio, rotate selector switch to the VHF set in use, press foot microphone switch and talk. The operator can transmit only on the VHF set and channel selected by the pilot.

6. To use hand held microphone with this system, it is necessary for the pilot to operate both the throttle microphone switch and the "PRESS-TO-TALK" switch on the microphone.

(d) RECEPTION.

1. All receivers are always in the stand-by condition.

2. The interphone (ICS) system will always take precedence over any other message being received.

3. For VHF radio, operate the switches on the pilot's modified C-38/ARC-5 and C-45/ARC-1 controls to select the desired VHF set and channel, as described under (c) TRANSMISSION above.

4. For HF radio (if installed) turn toggle switch REC. "C" on the modified C-38/ARC-5 to the "UP" position and set for maximum tolerable noise. The navigation and range receiver outputs should be at minimum while this is being done.

5. For navigation receiver (R-4A/ARR-2) operate the crank on the pilot's modified C-38/ARC-5 until the assigned channel appears in the window. Set the NAV-VOICE selector switch to "NAV". Set the OUTPUT control to produce a useably weak signal, or if the desired signal cannot be heard, to a fairly strong background hiss. Adjust the BEAT-NOTE control to produce a pleasing audible tone. Readjust OUTPUT control to produce a usable weak signal.

(If the signal is too strong, a clear-cut course indication cannot be obtained.) At the completion of this check, turn the sensitivity to a minimum.

6. For Range Receiver, on the C-26/ARC-5 set the rotary switch on "VOICE", advance the sensitivity control until normal background noise is heard, tune the desired radio range station and re-adjust the sensitivity control for normal operation.

7. For simultaneous reception on VHF and MHF turn the desired VHF switch and the REC. "C" switch to the "UP" position.

8. The choice of receivers is not available to the operator, he hears only those selected by the pilot. The operator's volume may be adjusted with the control provided on the C-39/ARC-5.

(7) IFF EQUIPMENT.—The AN/APX-2 transmitter-receiver, RT-24A/APX-2, is installed aft of Station 362. The pilot's control unit, C-57/APX-2, is located on the right side of the cockpit. The radar operator's control unit, C-56/APX-2, is located at the bottom center of his instrument panel.

(a) OPERATING INSTRUCTIONS.

1. TO START THE EQUIPMENT.—On the pilot control unit, C-57/APX-2, rotate the master control switch clockwise away from the "OFF" position and set it in the desired operating position.

2. TO CHANGE REPLY CODE.—On the operator control unit, C-56/APX-2, rotate the selector switch to the position designated by the commanding officer. Unless otherwise designated, this switch is set and left in position "1".

3. FOR G-BAND OPERATION.—On the pilot control unit throw the G-BAND switch to the "ON" position or flip it to the "TIME" position. (See below.)

4. FOR INT OPERATION.—On the pilot control unit throw the INT switch to the "ON" position or hold it momentarily in the "PRESS" position; or on the operator control unit hold the INT switch momentarily in the "PRESS" position. (See g. below.)

5. FOR DISTRESS OPERATION.—On the pilot control unit push the guard latch to the right (tilting it up) and rotate the master control switch to the "EMERGENCY" (extreme clockwise) position.

6. TO DESTROY THE RECEIVER TRANSMITTER UNIT.—If possible, warn radar operator. On the pilot control unit raise the red guard cover breaking the safety wire, and throw the DESTRUCT switch to the "ON" position. This will explode all Type AN/M1 destructors in the unit.

7. FURTHER OPERATING PROCEDURES.—Information on further operating procedures must be obtained from the commanding officer.

8. TO STOP THE EQUIPMENT.—On the pilot control unit rotate the master switch to the extreme counterclockwise position, marked "OFF".

9. Guards have been installed over the G-Band and INT switches described above. These guards shall not be removed unless specific instructions to the contrary are issued.

(8) RADIO ALTIMETER. — The AN/APN-1 radio altimeter is installed in the fuselage radio compartment on the right side, aft of the ladder bracket. The antennas are installed on the underside of each wing inner panel. The indicator is on the right side of the pilot's instrument panel. The limit switch is on the pilot's lower right instrument panel. The low limit light indicator is installed on the left side of the pilot's instrument panel.

WARNING

The high ranges of the altimeter must never be used when flying at altitudes within the low range or when landing. The high range is not calibrated for such use and an accurate zero altitude indication would not be obtained.

TO OPERATE:

(a) Turn the power switch, located on the indicator, to "ON".

(b) The limit switch SA-1/ARN-1 should be set at the desired altitude.

(c) True indication of altitude will be given by the indicator, ID-14B/APN-1, consecutively over the low and high ranges. (The effective high range starts at the upper limit of the low range.) Some fluctuation may be noticed in the indicator reading when flying over rough or uneven terrain or when flying through bumpy air. At an altitude considerably above the upper limit of each range the indicator needle may be expected to fall back from its full position.

(d) The limit indicator relieves the pilot of constant attention to the indicator scale. The indicator consists of a red lamp which indicates flight below the "pre-set altitude" (on Limit Switch).

g. RADAR EQUIPMENT—MODEL F7F-3N AIRPLANE.—The F7F-3N airplane is equipped with an Army type SCR720A or SCR720C Radar System. All of the controls are located in the operator's cockpit. Both cockpits are provided with indicators.

(1) TO OPERATE (SCR 720A).

(a) Before applying power to the equipment, make all initial settings in accordance with the Table below:

INITIAL SETTINGS OF CONTROLS

Unit	Control	Setting
Synchronizer	RANGE	MAXIMUM
Synchronizer	RANGE MARKER INTENS	MINIMUM (counterclockwise)
Synchronizer	RANGE STATUTE MILES	10
Synchronizer	AFC	OFF
Synchronizer	RADAR-BEACON	RADAR
Synchronizer	RCVR GAIN	MINIMUM (counterclockwise)
Control Box	ANTENNA ROTATION	OFF
Operator's Indicator	INTENS (B SCOPE)	MINIMUM (counterclockwise)
Operator's Indicator	SCALE ILLUM	MINIMUM (counterclockwise)
Operator's Indicator	INTENS (C SCOPE)	MINIMUM (counterclockwise)
Pilot's Indicator ^a	INTENS	MINIMUM (counterclockwise)
Pilot's Indicator ^a	SCALE ILLUM	MINIMUM (counterclockwise)

^aAdvise pilot over interphone system to make these settings.

(b) Push the POWER ON button on the control box located in the operator's cockpit.

(c) Turn INTENS controls, two on operator's indicator and one on pilot's indicator, fully counterclockwise.

(d) Turn the AFC switch on the synchronizer to the "OFF" position.

(e) After approximately 30 seconds press the PRESS TO READ CRYSTAL CURRENT button on the control box, and read the meter on the control box while rotating the RCVR. FREQ. control on the synchronizer through its entire range of three revolutions. The maximum meter reading should be between 0.6 and 1.5 milliamperes.

(f) Turn the RANGE STATUTE MILES switch on the synchronizer to the extreme clockwise position.

(g) Place the ANTENNA ROTATION switch on control box in the "ON" position.

(h) Place the TILT control switch on control box in "AUTO" position, with LOWER LIMIT control on -10° and UPPER LIMIT control on $+5^\circ$.

(i) Turn the INTENS control on "B" and "C" scopes on the operator's indicator clockwise as far as is necessary to determine if a line of light will appear. Notice that the traces on the "C" scope follow the limits of elevation of antenna. If the line does not appear on at least one of the scopes, check that TILT control switch (on control box) is in "AUTO" position with UPPER LIMIT control on $+5^\circ$ and LOWER LIMIT control on -10° . If no results are obtained, DO NOT PROCEED.

(j) Turn the RANGE STATUTE MILES switch on the synchronizer to the second position from the left.

(k) Turn the RADAR BEACON switch on the synchronizer to "RADAR" position.

(l) Turn the INTENS controls on the operator's indicator "B" and "C" scopes and on the pilot's indicator to the extreme counterclockwise position.

(m) Make sure two minutes have elapsed since the POWER ON button on the control box was pressed. At high altitudes and in cold temperatures make sure three minutes have elapsed.

(n) Press the TRANSMITTER ON button on the control box.

(o) Read the transmitter current on the meter on the control box. It should read approximately 17 milliamperes. If it reads more than 20 milliamperes, press the TRANSMITTER OFF button and notify the maintenance crew. If there is no meter indication press the TRANSMITTER OFF button, and wait 30 seconds, then press the TRANSMITTER ON button again. Repeat two or three times if necessary. If there is still no indication, notify the maintenance crew.

(p) Turn the RCVR GAIN control on the synchronizer to the maximum counterclockwise position.

(q) Turn the INTENS control on the operator's "B" scope clockwise until the sweep pattern is barely visible on the "B" scope.

(r) Turn the INTENS control on the operator's "B" scope counterclockwise until the pattern just disappears.

(s) Set both TILT LIMIT switches on the control box to the -10° position.

(t) Turn the RCVR. GAIN control on the synchronizer clockwise until noise level causes the "B" scope to perceptibly brighten.

(u) Adjust the RCVR. FREQ. control on the synchronizer until a maximum ground signal is obtained.

(v) Turn AFC switch on the synchronizer to the "ON" position. There should be little or no change in the pattern on the scopes as the result of this operation. If there is a change, turn the AFC control to the "OFF" position.

(w) Turn the RANGE MARKER INTENS control on the synchronizer until the range marker line is clearly visible on the screen.

(x) Adjust the RANGE dial on the synchronizer until the range line just touches the lower extremity of some ground signal.

(y) Turn INTENS control on the operator's "C" scope clockwise until the ground signal selected on the "B" scope is visible on the "C" scope.

(2) TARGET SEARCH OPERATION.

(a) Turn equipment on by following the instructions given above.

(b) Set the TILT LIMITS switches on the control box to the desired setting.

(c) Set the RANGE STATUTE MILES switch to the desired position.

(d) Check occasionally the setting of the RCVR. FREQ. control on the synchronizer during operation. To do this, turn the AFC control on the synchronizer to the "OFF" position, and then reset the RCVR. FREQ. control for best indication on the scopes. (The use of AFC is optional.)

(e) All controls except the following may require adjustments during target search operation:

1. On the synchronizer

ADJ. AZIM. SWEEP OPR.-B
ADJ. AZIM. SWEEP OPR.-C
ADJ. ELEV. SWEEP-PILOT
ADJ. ELEV. SWEEP-OPR.
ADJ. RANGE SWEEP-ZERO
ADJ. RANGE SWEEP-AMPL.

2. On the operator's indicator:

H CNTR.-B & C SCOPES

3. On the pilot's indicator:

H CNTR.
V CNTR.
AZIM.

(3) BEACON SEARCH OPERATION.

(a) Turn the AFC switch on the synchronizer to the "OFF" position.

(b) Turn the TILT CONTROL switch on the control box to the "CONT. AT 0°" position.

(c) Place the RADAR-BEACON switch on the synchronizer to the "BEACON" position.

(d) Set the RCVR. FREQ. control on the synchronizer in the position for which maximum crystal current (as read on the meter on the control box) is obtained.

(e) Head the plane in the direction from which beacon signals are expected, if known. If unknown, fly slow circles.

(f) While the preceding step is being carried out, slowly rotate the RCVR. FREQ. control on the synchronizer back and forth through an arc, covering about one half turn on each side of the maximum point found in step (d) above. If no beacon signal is found, rotate the control slowly through its entire range of three complete turns.

(4) STOPPING THE EQUIPMENT.

(a) Turn the INTENS controls on all indicators to the extreme counterclockwise position.

(b) Turn the RCVR. GAIN control on the synchronizer to the extreme counterclockwise position.

(c) Set TILT CONTROL on the control box to the "CONT. AT 0°" position.

(d) Place the ANTENNA ROTATION switch on the control box in the "OFF" position.

(e) Push the TRANSMITTER OFF button on the control box.

(f) Push the POWER OFF button on the control box.

(5) PRECAUTIONS DURING OPERATION.

(a) Do not hold down the TRANSMITTER ON button more than 3 or 4 seconds if the transmitter will not stay on.

(b) Turn off the equipment immediately if any abnormal operation is observed.

(c) Do not remove the connectors from any unit unless all switches are in the "OFF" position.

(d) Keep the average intensity on both indicators as low as possible for satisfactory performance. Intense stationary spots on the indicator screen will burn the material on the face of the cathode-ray tube.

(e) If the aircraft power supply system should fail during operation, turn off the equipment immediately. After the trouble has been remedied, the equipment may again be put into operation.

(6) TO OPERATE (SCR 720C).

(a) Before applying power to the equipment, make all initial settings of controls in accordance with table below.

INITIAL SETTINGS OF CONTROLS

UNIT	CONTROL	SETTING
Synchronizer	RANGE THOUSANDS OF FEET	Maximum
Synchronizer	AFC	Do Not Touch
Synchronizer	GATE	NARROW
Synchronizer	RANGE MARKER INTENS	Minimum (counterclockwise)
Synchronizer	RANGE STATUTE MILES	10
Synchronizer	AFC	OFF
Synchronizer	RADAR-BEACON	Minimum (counterclockwise)
Synchronizer	RCVR. GAIN	RADAR
Control Box	ANTENNA ROTATION	OFF
Control Box	SLOW-FAST	SLOW
Control Box	ANTENNA ELEVATION	OFF
Operator's Indicator	INTENS ("B" SCOPE)	Minimum (counterclockwise)
Operator's Indicator	SCALE ILLUM	Minimum (counterclockwise)
Operator's Indicator	INTENS ("C" SCOPE)	Minimum (counterclockwise)
Pilot's Indicator*	INTENS	Minimum (counterclockwise)
Pilot's Indicator*	SCALE ILLUM	Minimum (counterclockwise)
Hand Control Unit	KNOB	Extreme (counterclockwise)
Hand Control Unit	LEVER	Neutral (zero-degree) elevation position

*Advise the pilot over the interphone system to make these settings.

(b) STARTING THE EQUIPMENT.

1. Press POWER ON button on control box.
2. Adjust SCALE ILLUM on the operator's indicator for minimum satisfactory visibility of indicator scale calibrations.

Note

Allow at least one minute between steps

1. and 3. to permit tubes to warm up.

3. Press the PRESS TO READ CRYSTAL CURRENT button on control box. The meter reading should be 0.5 to 1.5 ma.

4. Press TRANSMITTER ON button on control box and watch meter for indication of TRANSMITTER CURRENT. If the meter does not rise smoothly to approx. 15 ma. almost immediately, press TRANSMITTER OFF button and wait 15 or 20 seconds more before again pressing TRANSMITTER ON button. Transmitter is now "on the air".

CAUTION

Do not keep the TRANSMITTER ON button depressed. Operate only momentarily.

(c) STOPPING THE EQUIPMENT.

1. Press POWER OFF button on control box.
2. Operate the ANTENNA ROTATION switch on control box to "OFF".
3. Turn RCVR. GAIN control on synchronizer to extreme counterclockwise position.

(d) PLACING THE EQUIPMENT IN STAND-BY CONDITION.—After the equipment has been in operation, it may be placed in stand-by condition if further operation is required on a moment's notice.

1. Press TRANSMITTER OFF button on control box.
2. Throw ANTENNA ROTATION switch

on control box to "OFF".

(7) PREPARING THE EQUIPMENT FOR OPERATION.

(a) After the equipment has been started, as covered in paragraph (6)(b) of this section, it must be prepared for operation.

1. Turn up INTENS control on operator's indicator "B" scope until faint vertical line (sweep trace) appears on "B" scope screen. If no line can be seen, back up INTENS control to minimum again and throw ANTENNA ROTATION switch on control box to "ON"; then again turn up INTENS control until the sweep trace is observed moving across from left to right. Stop lateral sweep in about the middle of the screen by throwing ANTENNA ROTATION switch to "OFF". Now readjust INTENS control until trace is a faint vertical line.

CAUTION

Keep the average intensity on the indicators as low as possible for satisfactory performance. Intense stationary spots on an indicator screen will burn the coating material on the screen.

2. Increase RCVR. GAIN control on synchronizer until trace shows slight evidence of brightening.
3. Vary RCVR. GAIN knob on synchronizer slowly until either bright spots (targets or echoes) are seen along its length or until transmitted pulse (bright spot at bottom of trace) is at a maximum.
4. To start antenna rotating, throw ANTENNA ROTATION switch on control box to "ON" and SLOW-FAST switch to "FAST".
5. Readjust RCVR. GAIN control on synchronizer or INTENS control on operator's indicator or both, as required, to maintain satisfactory brilliance of targets. Optimum setting is obtained when targets "pop up" out of an otherwise dim screen.

Note

The antenna is now rotating through 360 degrees in a horizontal plane. Horizontal scanning is limited to the forward 180-degree sector, the rear 180-degree sector being blanked out. To scan a zone forward on the vertical axis of the aircraft proceed as outlined in paragraph (8)(e) of this section.

6. Turn up INTENS control on operator's indicator "C" scope until flying spot is seen on "C" scope, then back off INTENS control slowly until spot just disappears.

7. Advance RANGE MARKER INTENS control on synchronizer until horizontal line (range mark) is drawn across face of "B" scope at range corresponding to five miles (26,000 feet).

8. Turn AFC switch on synchronizer to "ON".

Note

No change in appearance of either screen should be noted.

9. Advise pilot, over interphone system, to adjust SCALE ILLUM control on pilot's indicator for minimum satisfactory visibility of indicator scale calibrations.

10. Advise pilot to turn up INTENS control on pilot's indicator until flying spot is seen, then back off INTENS control slowly until spot just disappears.

(8) OPERATION.

(a) SERVICE SELECTION.—Turn RADAR-BEACON switch on synchronizer to "RADAR" or "BEACON".

(b) ANTENNA SPEEDS.—Either 100 or 360 rpm is available.

(c) RANGE SELECTION. — Turn RANGE STATUTE MILES switch on synchronizer to "26,000 FT." "10", "20", or "150".

1. On 26,000 FT. and 10 mile range with RADAR-BEACON switch in "RADAR" position, range marker appears, and pilot's indicator gives "C" presentation.

2. With GATE switch on synchronizer set on "NARROW" position, the pilot's scope and the "C" scope of the operator's indicator will show only targets within a 1500 foot region just beyond the range indicated by the RANGE THOUSANDS OF FEET dial. With GATE switch on "WIDE" position, these scopes will show targets within a 4500-foot region just beyond the range indicated by the range marker.

3. On 26,000 FT. range, with RADAR-BEACON switch in "BEACON" position, range markers do not appear; gating action is ineffective; "C" scope of operator's indicator shows all targets and the pilot's indicator gives a "C" presentation or all targets.

4. On 10, 20 and 150 mile ranges, with RADAR-BEACON switch in "BEACON" position, range marker does not appear; "C" scope of operator's

indicator shows all targets and pilot's indicator gives "B" presentation.

5. On 26,000 FT, 10 and 20 mile ranges, with RADAR-BEACON switch in "RADAR" position, the TRANSMITTER CURRENT meter reads about 17 ma.

6. On 150 mile range, with RADAR-BEACON switch in "RADAR" position, TRANSMITTER CURRENT meter reads about 4 ma.

7. On all ranges, with RADAR-BEACON switch in "BEACON" position, TRANSMITTER-CURRENT meter reads about 12 ma.

(d) RANGE MARKER CONTROL.

1. Turn RANGE THOUSANDS OF FEET dial on the synchronizer to place range marker immediately under a particular target on the "B" scope. The "C" scope will now show targets at the selected range only.

2. This control indicates ranges only to 26,000 feet on the 26,000 FT and 10 mile ranges with RADAR-BEACON switch in "RADAR" position.

(e) ANTENNA TILT CONTROL.

1. Tilt the antenna to any position between zero degrees and—30 degrees, by moving the LEVER on the hand control unit forward. Tilt the antenna to any position between zero degrees and+50 degrees, by moving the LEVER towards the operator.

2. Scan a zone forward on the vertical axis of the aircraft by turning the hand control unit clockwise until the internal switch just operates. This will cause the antenna to scan vertically ± 5 degrees either side of the axis of the paraboloid. Continued clockwise rotation of the KNOB will increase the angle of scan to the maximums of +50 degrees and —30 degrees. With the antenna scanning at any angle, the center of the scanned sector can be shifted by moving the LEVER on the hand control unit.

(f) CONTROLS AND ADJUSTMENTS NOT TO BE USED.—Do not tamper with any of the controls or adjustments listed in the following table. These require special adjusting techniques and should be carried out only by experienced maintenance personnel.

(g) CONTROL AND ADJUSTMENTS NOT TO BE USED.

MAJOR ASSEMBLY CONTROL OR ADJUSTMENT

Operator's Indicator	H CNTR	
	V CNTR	"B" Scope
	FOCUS	
Operator's Indicator	H CNTR	
	V CNTR	"C" Scope
	FOCUS	
Synchronizer	ADJ. AZIM. SWEEP OPR.	"B"
	ADJ. AZIM. SWEEP OPR.	"C"
	ADJ. ELEV. SWEEP PILOT	
	ADJ. ELEV. SWEEP OPR.	
	ADJ. RANGE SWEEP ZERO	
	ADJ. RANGE SWEEP AMPL	

Pilot's Indicator H CNTR
 AZIM.
 V CNTR
 FOCUS

**b. COMMUNICATION EQUIPMENT—
MODEL F7F-4N AIRPLANE.**

(1) **COMMUNICATING RADIO.**—AN/ARC-5 receiving and AN/ARC-1 receiving and transmitting equipment is installed in the fuselage between Stations 318 and 362.

(a) The following controls are installed in the pilot's cockpit. Refer to fig. 31A.

1. **RADIO MASTER SWITCH.**—On top of electrical control panel.

2. Circuit breakers for the individual Radio/Radar equipment are provided on the inboard aft face of the electrical control panel.

3. **ICS—RADIO MICROPHONE SWITCH.**—(A mask or lip microphone is normally used in this airplane)—On inboard (right engine) throttle handle.

Note

A J-193/AR jack box and a CX-922/AR extension cord set are installed on Sta. 203 bulkhead.

4. The C-242/AIC-4, C-333/ARC-28 and two C-45/ARC-1 Control units are installed on the right side.

(b) The following controls are installed in the radar operator's cockpit. Refer to figs. 58D and 59B.

1. Foot operated "PRESS-TO-TALK" microphone switch—on forward right side of cockpit.

Note

A J-193/AR jack box and a CX-922/AR extension cord set are installed on operator's rear armor.

2. C-174/AIC-4 Control—on left side of forward instrument panel.

(c) Two RT-18/ARC-1 Transmitter-Receivers and an RE-51/ARC-28 relay unit are installed in the fuselage aft of Station 318.

(2) **INTERPHONE.**—An AM-40/AIC amplifier unit is installed in the lower part of the fuselage aft of station 318. The controls are combined with the Communication Radio Controls.

(3) **NAVIGATION RECEIVER.** — An R-4A/ARR-2 receiver is installed in the fuselage adjacent to the radio range receiver. The C-35/ARR-2A control is in the pilot's cockpit adjacent to the other radio controls.

(4) **RANGE RECEIVER.**—An R-23/ARC-5 radio range receiver is installed in the top part of the fuselage aft of sta. 318. The C-26/ARC-5 tuning control is installed on the right side of the pilot's cockpit adjacent to the other radio controls.

**(5) FUNCTION OF C-242/AIC-4 PILOT'S
CONTROL AND OF C-174/AIC-4
OPERATOR'S CONTROL.**

(a) When the NORMAL-ALTERNATE selector switch on the C-242/AIC-4 pilot's control is in the "NORMAL" position all audio outputs (Both ARC-1's, the R-23/ARC-5 and the R-4A/ARR-2 receivers) are applied to the interphone amplifier. The pilot alone will hear the R-23/ARC-5, and the R-4A/ARR-2 receivers. Both the pilot and the operator will hear the output of either ARC-1 set.

(b) The NORMAL—ALTERNATE selector switch on the C-242/AIC-4 control is always in the "NORMAL" position except when the interphone amplifier becomes inoperative, at which time the switch is placed in the "ALTERNATE" (EMERGENCY) position. This will cause all audio output, at reduced levels, to be heard by both the pilot and the operator. The pilot and the operator will be unable to communicate with each other. However, if the selector switch is inadvertently placed in the "ALTERNATE" position when the AM-40/AIC is operating, the pilot can call the operator but the operator can not answer.

(c) The radio volume controls on the C-242/AIC-4 pilot's control and the C-174/AIC-4 operator's control affect only the output of the ARC-1 receivers.

(d) The ICS-VHF-HF microphone selector switch, HF sensitivity control and the HF receiver switch on the C-242/AIC-4 pilot's control are inoperative in this airplane.

(e) The receiver selector switch on the C-174/AIC-4 operator's control is inoperative in this airplane.

(6) OPERATION.

(a) Insert the microphone and headset plugs into the jacks and make sure that they are completely engaged.

(b) Set battery switch and radio master switch (pilot's cockpit) to "ON". Make certain that the circuit breakers are not tripped.

(c) TRANSMISSION.

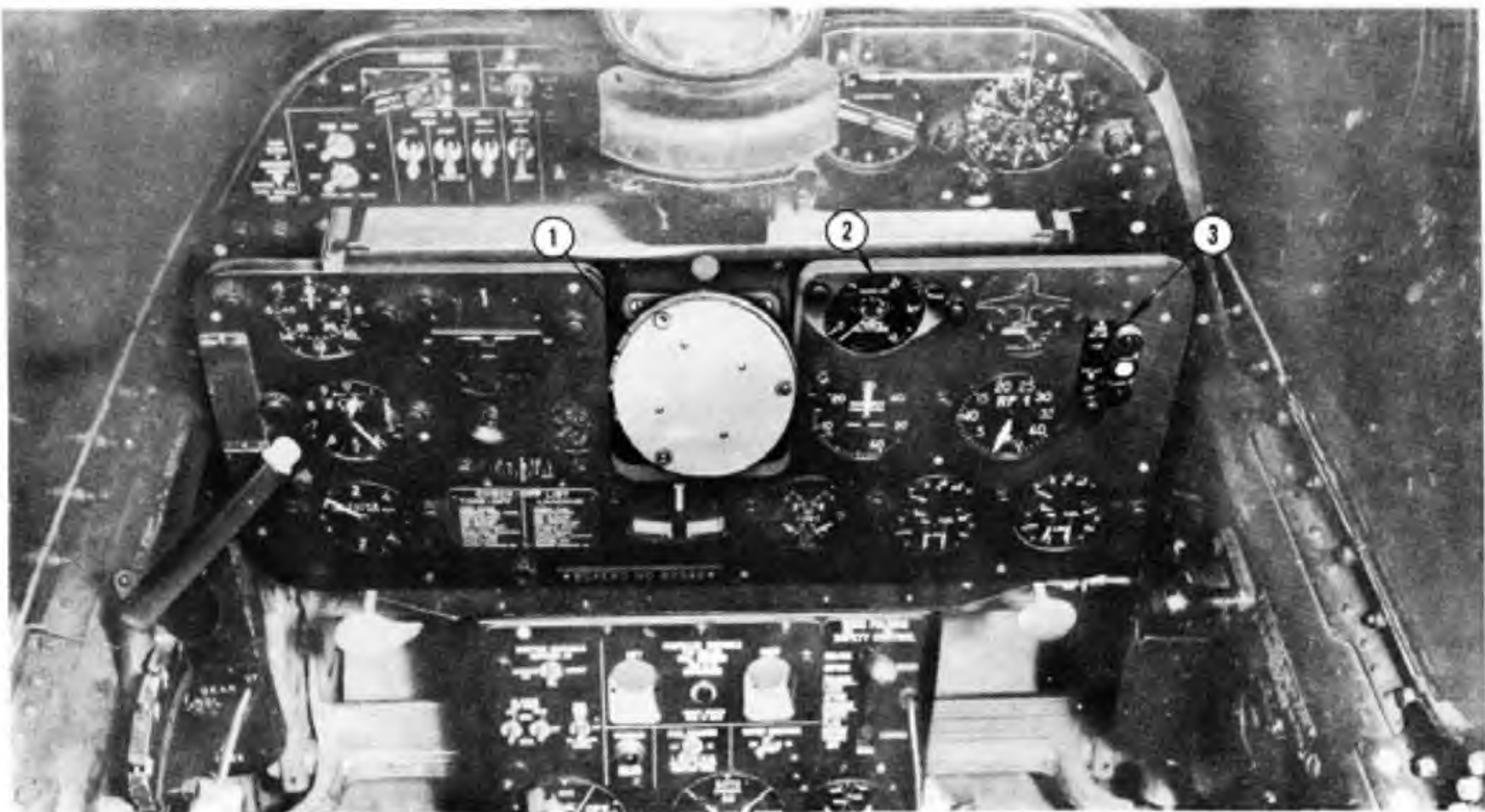
1. The position of the ICS-RADIO switch on the engine control quadrant and the position of the ICS-VHF switch on the operator's C-174/AIC-4 control will determine transmission on either the intercommunicating system or VHF radio.

2. The position of the selector switch on the C-333/ARC-28 pilot's control will determine which VHF set is used for transmission.

CAUTION

Do not use the "RELAY" position on the C-333/ARC-28 unless specific instructions to do so have been issued.

3. The C-45/ARC-1 control switches are operated as follows: for transmission and reception on any one of nine main channels use position "MAIN T/R"; for transmission and reception on any main



1. Space Provision for Radar Repeat Indicator (AN/APS-19)
2. Radio Altimeter Indicator (ID-14B/APN-1)
3. Radio Altimeter Limit Lights

Figure 56A—Pilot's Radar Indicator and Controls (F7F-4N Airplane)

channel and simultaneous reception on the GUARD channel use position "BOTH"; for transmission and reception on the GUARD channel use position "GUARD".

4. For the pilot to transmit on ICS, throw throttle switch to the "ICS" position and talk into microphone; to transmit on radio, select channel desired as described above, throw throttle switch to the "RADIO" position and talk.

5. For radar operator to transmit on ICS, rotate selector to "ICS", press foot microphone switch, and talk; to transmit on radio, rotate selector switch to "VHF", press foot microphone switch and talk. The operator can transmit only on the VHF set and channel selected by the pilot.

(d) RECEPTION.

1. The range and the navigation receivers are always in the stand-by condition and can be heard by advancing the sensitivity controls on the associated control.

2. The interphone (ICS) system will always take precedence over any other message being received.

3. For VHF radio, operate the selector switches on the C-333/ARC-28 and on the C-45/ARC-1 controls as desired.

4. For navigation receiver (R-4A/ARR-2) operate the crank on the pilot's C-35/ARR-2A until the assigned channel appears in the window. Set the NAV-VOICE selector switch to "NAV". Set the OUTPUT control to produce a useably weak signal, or if the desired signal can not be heard, to a fairly strong background hiss. Adjust the BEAT-NOTE control to produce a pleasing audible tone. Readjust OUTPUT control to produce a useably weak signal. (If the signal is too strong, a clear-cut course indication can not be obtained.)

5. For Range Receiver on the C-26/ARC-5 set the rotary switch on "VOICE", advance the sensitivity control until normal background noise is heard, tune the desired radio range station and readjust the sensitivity control for normal operation.

(e) RELAY.

1. The ARC-28 equipment permits use of the two AN/ARC-1 units as an automatic radio relay system (SYSTEM "A") to provide long range VHF communication.

2. Rotate the selector switch on the C-333/ARC-28 control "RELAY" position, then rotate the channel selector switches on the two C-45/ARC-1 controls to the two channels selected for relay operation. The equipment will now operate automatically. To insure proper operation the system should be monitored.

3. No local transmitter-receiver control is provided in the "RELAY" position. In order to transmit from the airplane the selector switch must be

moved from "RELAY" to either VHF no. 1 or VHF no. 2.

(7) IFF EQUIPMENT.—The AN/APX-2 transmitter-receiver, RT-24A/APX-2, is installed aft of sta. 362. The pilot's control unit, C-57/APX-2 is located on the right side of the cockpit. The radar operator's control unit, C-56/APX-2, is located on the right side of his cockpit.

(a) OPERATING INSTRUCTIONS.

1. TO START THE EQUIPMENT.—On the pilot control unit C-57/APX-2 rotate the master control switch clockwise away from the "OFF" position and set it in the desired operating position.

2. TO CHANGE REPLY CODE.—On the operator control unit, C-56/APX-2, rotate the selector switch to the position designated by the commanding officer. Unless otherwise designated, this switch is set and left in position "1".

3. FOR G-BAND OPERATION. — On the pilot control unit flip the G-Band switch down to the "TIME" position. (See below.)

4. FOR INT OPERATION.—On the pilot control unit hold the INT switch down momentarily in the "PRESS" position; or on the operator's control unit hold the INT switch momentarily in the "PRESS" position. The responsor gain is controlled by either the pilot or radar operator. The gain is controlled at the pilot's control unit until the GAIN control is rotated to "REMOTE", at which position the gain is controlled at the operator's control unit.

5. FOR DISTRESS OPERATION.—On the pilot control unit push the guard latch to the right (tilting it up) and rotate the master control switch to the "EMERGENCY" (extreme clockwise) position.

6. TO DESTROY THE TRANSMITTER-RECEIVER UNIT.—If possible, warn operating personnel to stand clear of the receiver-transmitter unit. On the pilot control unit raise the red guard cover breaking the safety wire, and throw the DESTRUCT switch to the "ON" position. This will explode all Type AN/M-1 Destructors in the unit.

7. FURTHER OPERATING PROCEDURES.—Information on further operating procedures must be obtained from the Commanding Officer.

8. TO STOP THE EQUIPMENT. — On the pilot control unit rotate the master control switch to the extreme counterclockwise position, marked "OFF".

9. Guards have been installed over the G-Band and INT switches described above to prevent them being placed in the "ON" (up) position. These guards shall not be removed unless specific instructions to the contrary are issued.

(8) RADIO ALTIMETER. — The AN/APN-1 radio altimeter is installed in the fuselage radio compartment on the right side, aft of the ladder bracket. The antennas are installed on the underside of each wing inner panel. The indicator is on the right side of the pilot's instrument panel. The limit switch is

on the pilot's lower right instrument panel. The limit light indicator is installed on the right side of the pilot's instrument panel. A repeat indicator is installed in the radar operator's cockpit, on the instrument panel. (See Note 2 below).

WARNING

The high ranges of the altimeter must never be used when flying at altitudes within the low range or when landing. The high range is not calibrated for such use and an accurate zero altitude indication would not be obtained.

(a) Turn the power switch, located on the indicator, to "ON".

(b) The limit switch SA-1/ARN-1 should be set at the desired altitude.

(c) True indication of altitude will be given by the indicator, 1D-14B/APN-1, consecutively over the low and high ranges. (The effective high range starts at the upper limit of the low range.) Some fluctuation may be noticed in the indicator reading when flying over rough or uneven terrain or when flying through bumpy air. At an altitude considerably above the upper limit of each range the indicator needle may be expected to fall back from its full position.

(d) The limit indicator relieves the pilot of constant attention to the indicator scale. The indicator consists of three colored lamps, one for each of the three conditions of relay contact operation. The lamps are lighted as follows:

1. Red—indicates flight below "PRE-SET" altitude (on limit switch).
2. White—indicates flight at approximately the "PRE-SET" altitude.
3. Green—indicates flight above the "PRE-SET" altitude.

Note

1.

At the factory only the Red indicator light is connected to the receiver. Wire splices have been provided, just forward of the instrument panel, so that by connecting the proper wires any desired arrangement of light operation can be obtained.

2.

The remote indicator is located in the radar operator's compartment. The power switch and the range switch on this indicator do not function electrically, although they can be rotated. The meter reads only if this instrument is connected to the system. The equipment is turned ON or OFF and the range changes on the pilot's indicator only.

i. RADAR EQUIPMENT— MODEL F7F-4N AIRPLANE.

(1) The F7F-4N Airplane is equipped with wiring provisions for AN/APS-19 radar. The radar control unit is to be installed in the operator's cockpit. The airplane is equipped with mounting provisions for the installation of a repeat indicator in the pilot's cockpit.

Note

Inasmuch as the radar indicator ID-158/APS-19 has integral radio altimeter limit lights installed in the rim, the present limit lights described above under "RADIO ALTIMETER" will be removed when the repeat indicator is installed in the pilot's cockpit.

(2) TO OPERATE (AN/APS-19).

(a) Before applying power to the equipment, make all initial settings in accordance with the table below:

UNIT	CONTROL	SETTING
Control Box	GAIN	AUTO
Control Box	SCAN ANGLE	130°
Control Box	FUNCTION	OFF
Control Box	RANGE	100
Control Box	TUNE	AUTO
Control Box	SEA SUPPRESS	OFF

(b) Turn the FUNCTION switch on control box C-282/APS-19, located in the operator's cockpit, to the desired position of "BEACON, SEARCH or INT'CPT". After a three minute warm up period, which is controlled by a time delay relay in the equipment, performance of the equipment is obtained in the pre-selected function by the following operations:

1. SEARCH.

- a. Turn FUNCTION selector switch to "SEARCH".
- b. Turn SCAN ANGLE to 130 degrees.
- c. When a target echo appears on the screen, turn RANGE switch to the shortest range at which the target can be seen. When on SEARCH the "AIM" position cannot be used.
- d. When the target echo is within 30 degrees azimuth, switch the SCAN ANGLE to 30 degrees.
- e. Continue to turn the RANGE control to the shortest range in which the target can be seen.
- f. When SEARCH operation is completed, turn all controls to the following positions:

GAIN	to	AUTO
SCAN ANGLE	to	130°
RANGE	to	100
SEA SUPPRESS	to	OFF
TUNE	to	AUTO
FUNCTION	to	STAND-BY

2. BEACON.

a. The procedure for beacon is similar to search except that the FUNCTION selector is turned to "BEACON". The 150-mile RANGE setting is used on BEACON in place of the SEARCH 100-mile range.

3. INTERCEPT.

a. The procedure for intercept is similar to search except that the FUNCTION selector is turned to "INT'CEPT". The RANGE switch CAN BE positioned on AIM when ready. In "AIM" position only the 30 degree spiral scan will operate.

CAUTION

Turn RANGE switch out of AIM before switching to a new FUNCTION.

If sea return becomes too troublesome on INTERCEPT operation, use SEA SUPPRESS control.

4. GENERAL PRECAUTIONS.

a. When the equipment is not in use, see that the equipment controls are in an inoperative position as described above.

b. If any abnormal operation of the equipment is evident, turn off the equipment immediately.

c. Do not remove any of the dust covers while the equipment is ON. High voltages are employed in this equipment.

d. Ascertain that the equipment has been pre-flight checked. To assure yourself of its performance, turn it on long enough to see some echoes on the indicator screen. This check should be made at sufficient engine rpm to provide required voltages at the equipment.

(3) Space is provided in the operator's cockpit for a C-275/APA-16 L.A.B. control unit and associated rocket firing adapter TD-6/APA-16.

(4) Space is provided in the operator's cockpit for radar counter-measure homing equipment.

4. RADAR OPERATOR'S COCKPIT.

a. COCKPIT HOOD.

(1) GENERAL. — The hood is hinged to the cockpit on the left side and held in place by latch-pins on the right side. A hinged plexiglas access plate with a ventilator is installed in the hood. A finger latch for opening the hood is installed in the frame on the right side, and a control handle to operate the latch is installed inside. An emergency release handle is installed on the left, inside the hood.

(2) OPERATION.

(a) To open the hood from the outside—lift the finger latch and lift the hood to open. The latch will not operate if the control handle is in the forward (locked) position.

(b) To lock the hood from inside—move the control handle on the right hand side full forward.

WARNING

Be sure handle is locked full forward prior to take-off.

(3) EMERGENCY EXIT IN FLIGHT. — Refer to Section IV paragraph 6, emergency exit from cockpits.

b. SEAT AND HARNESS.—The seat is designed to take a life raft pack as a cushion and is not adjustable. The standard adjustable lap and shoulder type harness is attached to fittings on the cockpit floor (tank top) and on the armor plate back of the seat.

c. HEATER CONTROL.—A duct from the combustion type heater located in the fuselage nose carries air aft to an opening in the fuselage bulkhead forward of the cockpit, to the right of the centerline. The control is a cover plate equipped with a hand tab, which may be rotated to close off or regulate the amount of opening.

d. INSTRUMENTS.—The following flight instruments are installed on the panel.

- (1) Airspeed indicator.
- (2) Outside air temperature indicator.
- (3) Compass indicator.
- (4) Sensitive altimeter.
- (5) Clock.

e. EQUIPMENT.

(1) MAP CASE.—A standard map case is installed on the right side of the cockpit—forward.

(2) CHARTBOARD.—A standard chartboard is stowed below the instrument panel. To use the board clear the securing clamp and pull the board out.

CAUTION

Be sure that chartboard is secured in place for take-off and landing.

(3) PARACHUTE PACK STOWAGE.—A length of bungee cord is installed over a hook on the right hand side of the cockpit for stowage of a chest type parachute pack.

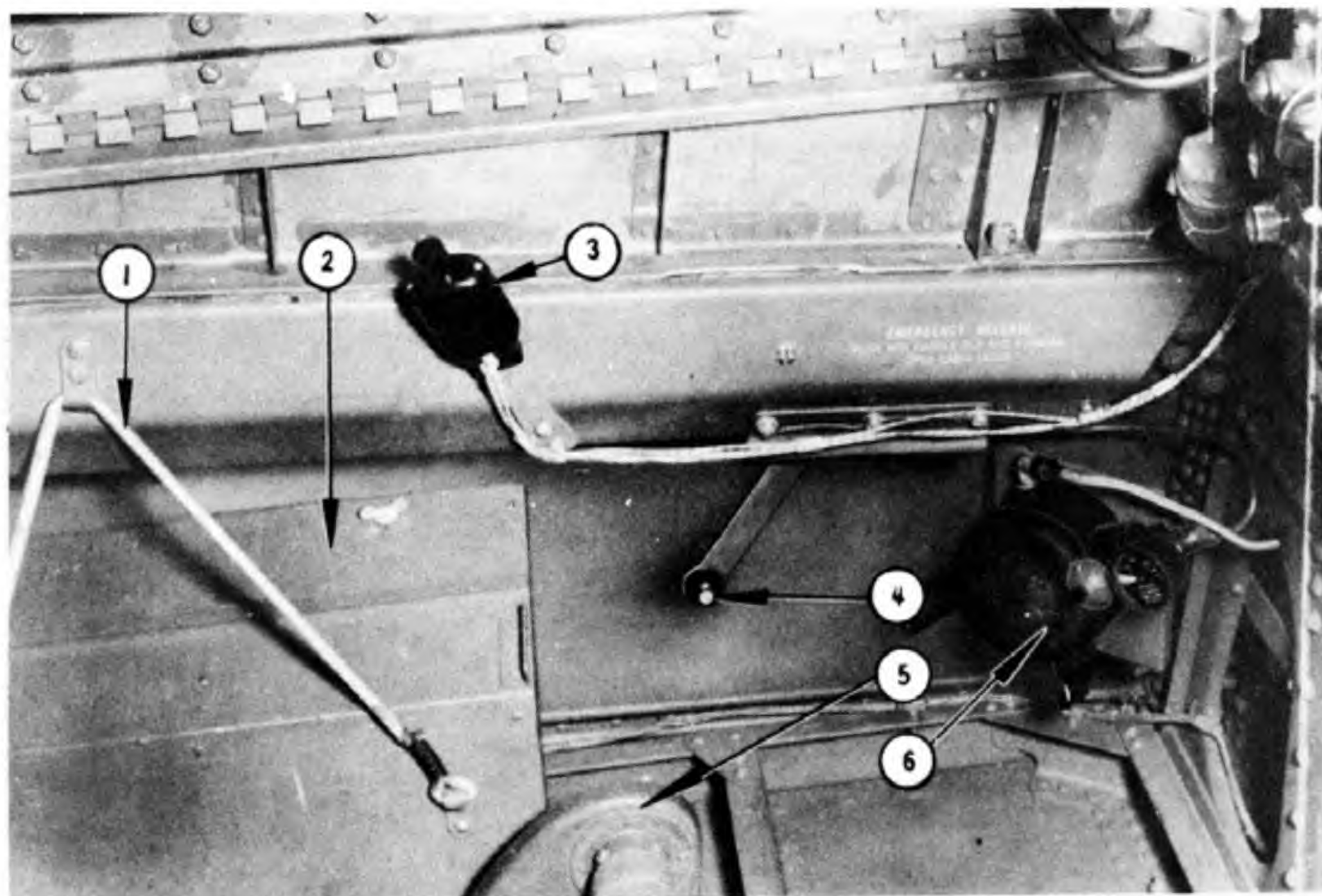
(4) EMERGENCY CONTAINER STOWAGE.—A length of bungee cord is installed over a hook on the left hand side of the cockpit for stowage of an emergency equipment container, above the oxygen bottle.

(5) RELIEF TUBE.—A relief tube is stowed in a clip below the seat.

f. ELECTRICAL EQUIPMENT. — This instrument panel is lighted by a reflector panel. The lighting is controlled by a rheostat switch (with circuit breaker).

Note

Rotate clockwise to ON and BRIGHT.
Rotate counterclockwise to DIM and OFF.
Spare lamps are stowed in a container on the panel.



- | | |
|-------------------------------------|----------------------------------|
| 1. Emergency Equipment Kit Retainer | 4. Emergency Hood Release Handle |
| 2. Cover—Oxygen Cylinder | 5. Seat Stanchion |
| 3. Mask Microphone Switch | 6. Oxygen Regulator |

Figure 57—Radar Operator's Cockpit—L.H. Side (F7F-2N Only)

g. OXYGEN EQUIPMENT.—A standard 514 cu. in. capacity oxygen cylinder, covered by a protecting plate, is installed in clamps on the floor to the left of the seat and the diluter-demand type regulator is installed on the left hand side of the cockpit, forward. A breathing tube and facepiece are attached. The oxygen flow indicator blinker is installed on the instrument panel. For operating information refer to paragraph 2., Oxygen, above.

b. COMMUNICATING EQUIPMENT.—The following equipment is installed:

(1) F7F-2N Airplanes.

- (a) Radar Indicator—ID-32/APS-6, on adjustable mount (with hand microphone in clip).
- (b) Main Radar Control—C-46/APS-6.
- (c) Auxiliary Radar Control—C-47/APS-6.
- (d) IFF Control Unit—C-56/APX-2.
- (e) Radio Control Unit—C-39/ARC-5.

A standard hand operated microphone switch is mounted on the left cockpit rail.

(2) F7F-3N Airplanes.

- (a) Radar Indicator—BC-1151-B.
- (b) Radar Synchronizer—BC-1148-D.
- (c) Main Radar Control—BC-1342.
- (d) Radar Antenna Tilt Control—BC-1341.
- (e) IFF Control Unit—C-56A/APX-2.
- (f) Radio Control Unit—C-39/ARC-5.

A foot operated microphone switch is installed on the floor, right side forward.

A standard hand operated microphone is stowed in a clip on the left cockpit rail. (Used in ferrying operations only.)

A standard combination head set and microphone is used by service personnel.

(3) F7F-4N Airplanes.

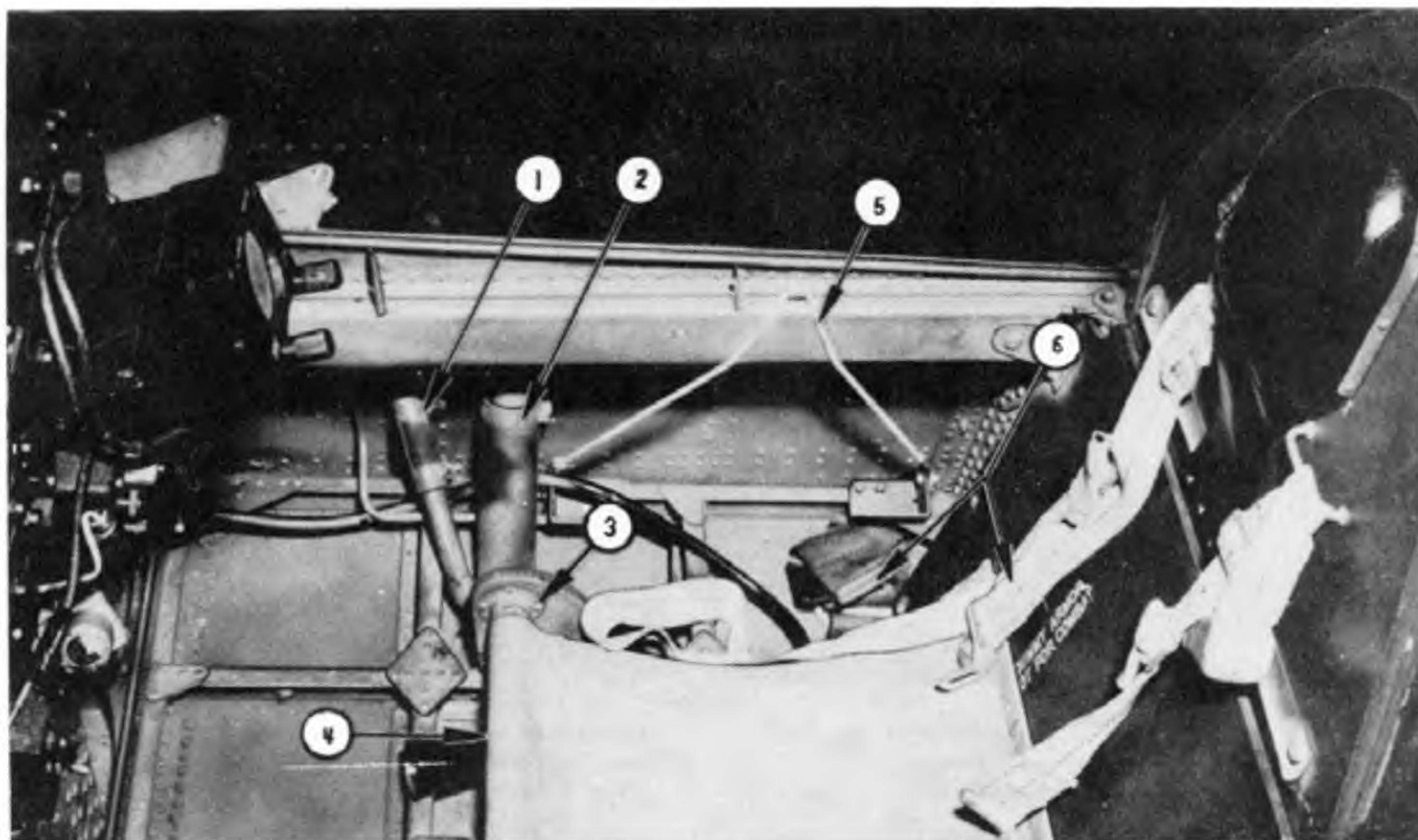
- (a) Radar Indicator—ID-158/APS-19 (includes radio altimeter indicator lights).
- (b) Radar Control Unit—C-282/APS-19.
- (c) IFF Control Unit—C-56/APX-2.
- (d) Radio Control Unit—C-174/AIC-4.

- (e) L.A.B. Control Unit—C-275/APA-16.
- (f) Rocket Adapter Unit—TD-6/APA-16.
- (g) Radio Altimeter Repeat Indicator—ID-14B/APN-1.

A foot operated microphone switch is installed on the floor, right side forward.

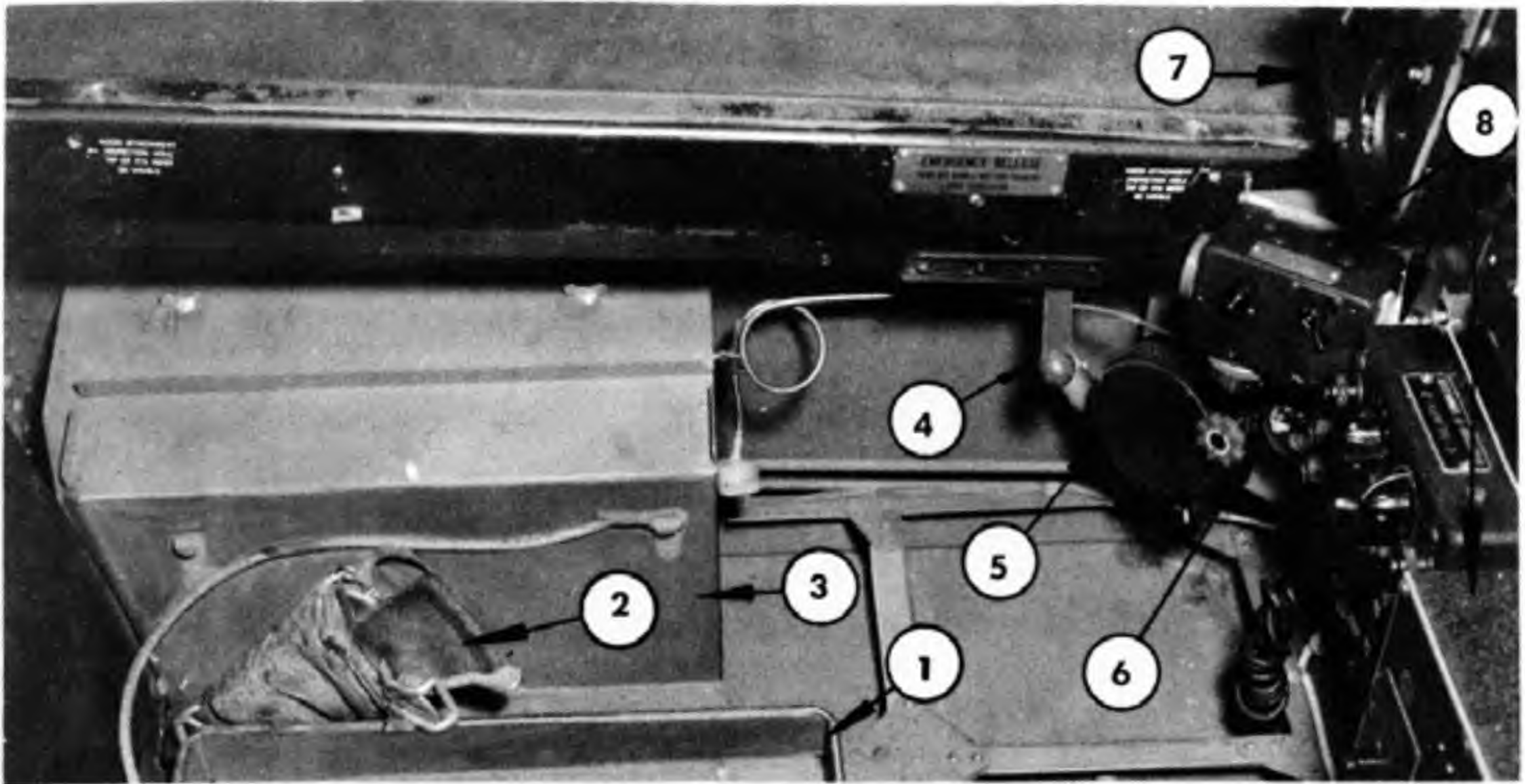
A standard hand operated microphone is stowed in a clip on the left cockpit rail. (Used in ferrying operations only.)

A standard combination head set and microphone is used by service personnel.



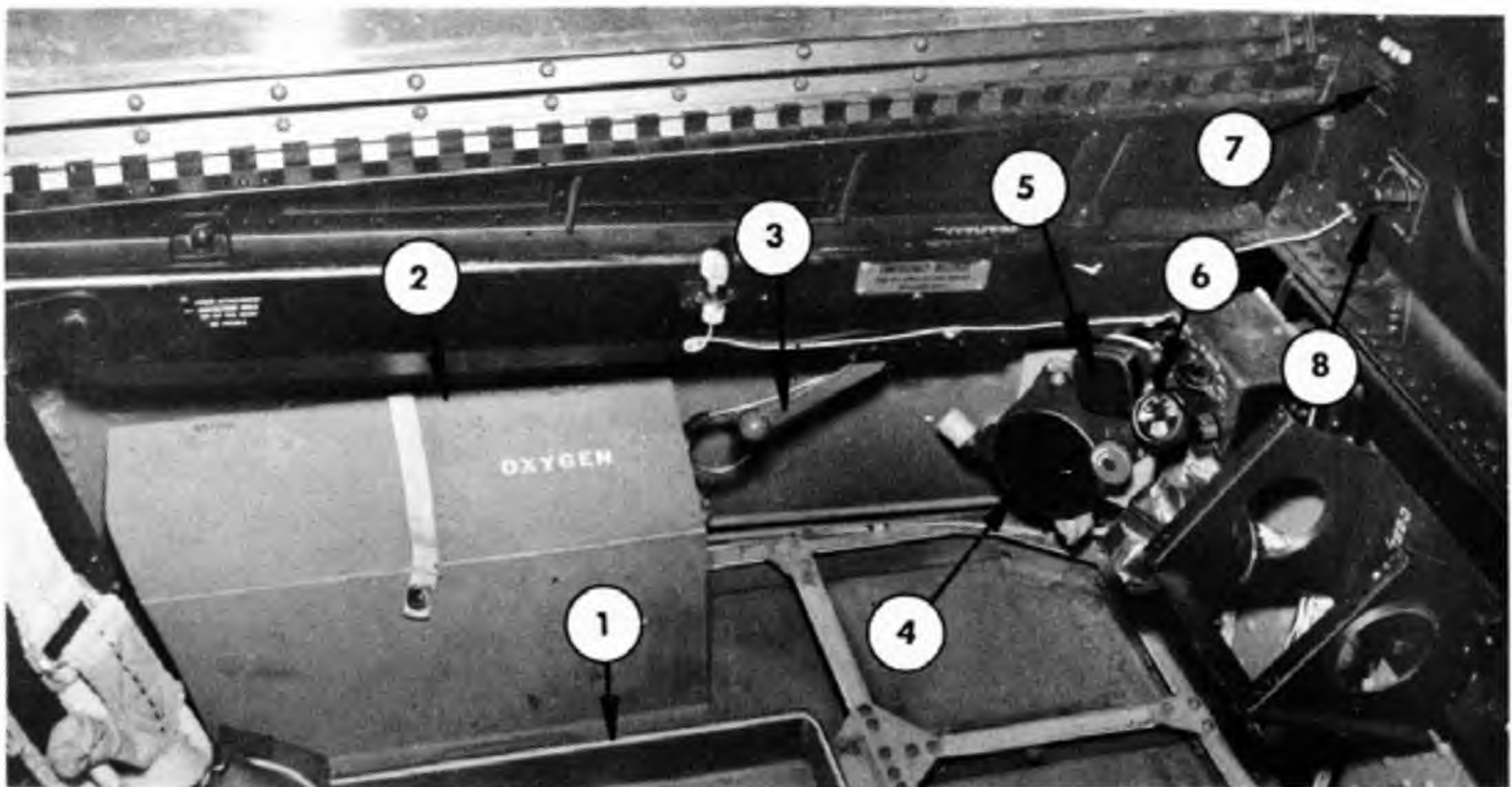
- | | |
|----------------------------|-----------------------------|
| 1. Reserve Tank Vent Line | 4. Seat |
| 2. Reserve Tank Fillerneck | 5. Parachute Pack Retainer |
| 3. Seat Stanchion | 6. Lap and Shoulder Harness |

Figure 58—Radar Operator's Cockpit—R.H. Side (F7F-2N Only)



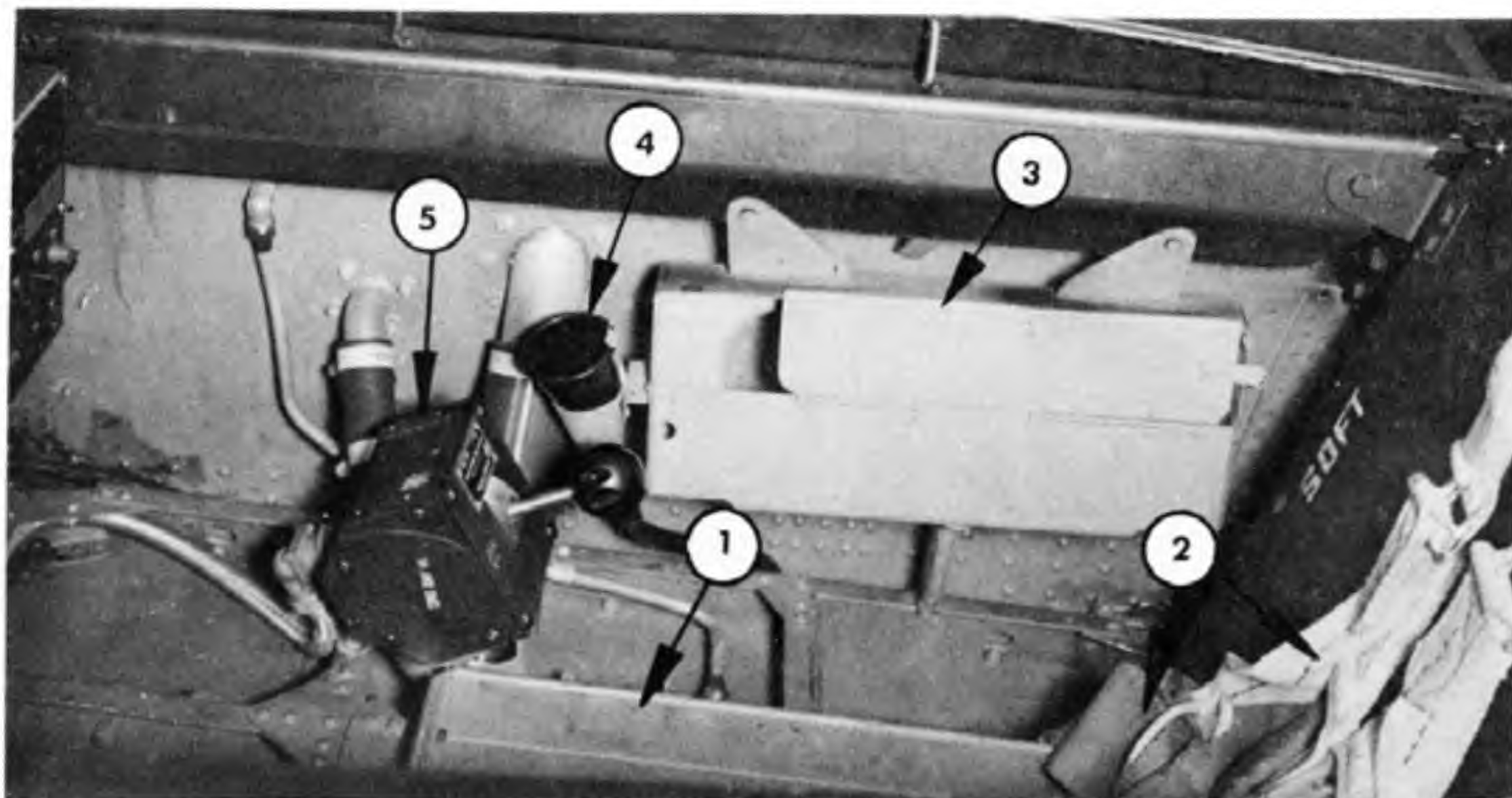
- | | |
|-----------------------------------|--------------------------------|
| 1. Seat Frame. | 5. Oxygen Flow Regulator. |
| 2. Safety Belt. | 6. Oxygen Pressure Gage. |
| 3. Oxygen Cylinder Cover. | 7. Left Hand Instrument Panel. |
| 4. Hood Emergency Release Handle. | 8. Communicating Controls. |

Figure 58A—Radar Operator's Cockpit—L.H. Side (F7F-3N Only)



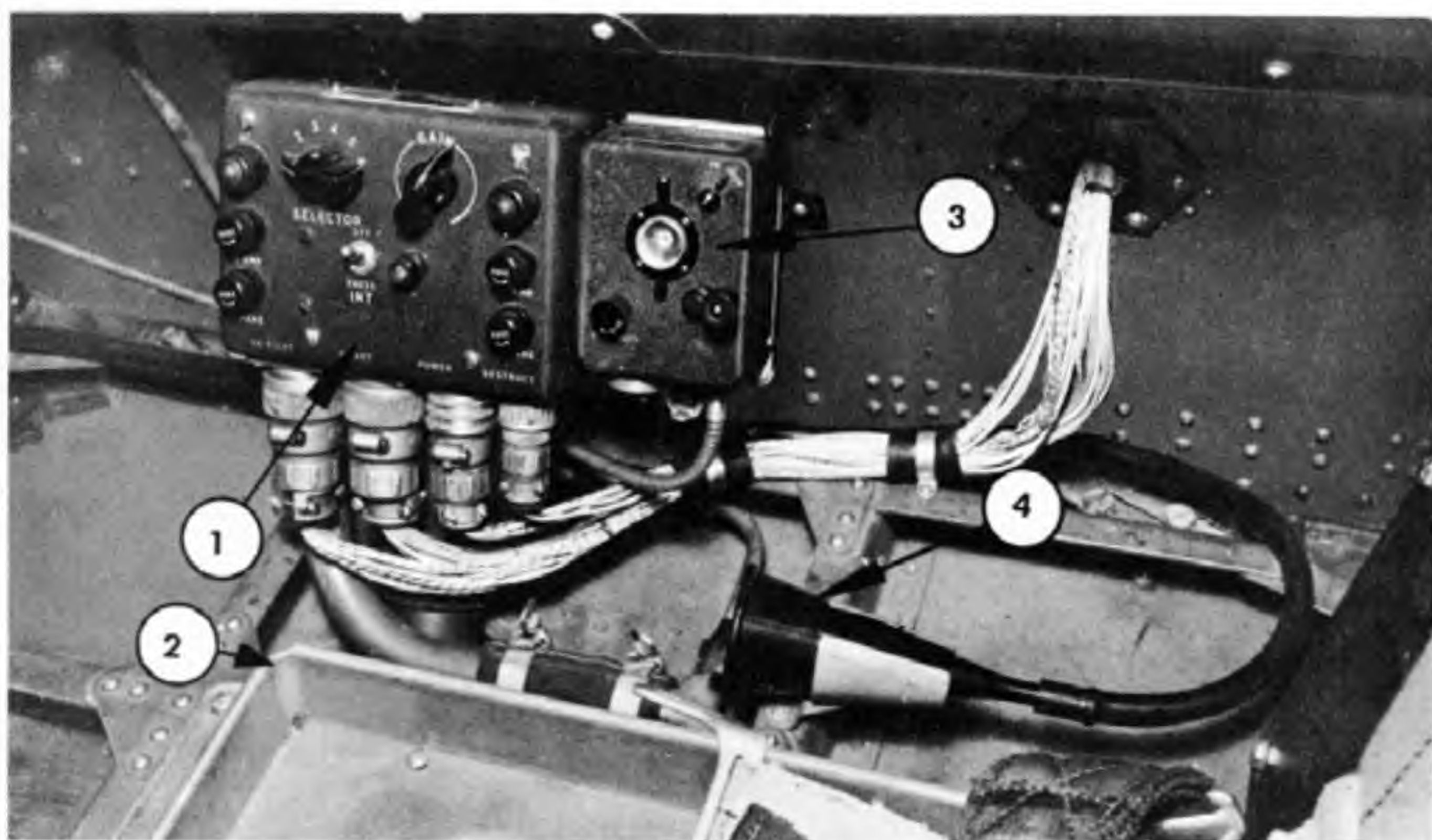
- | | |
|-----------------------------------|---|
| 1. Seat. | 5. Oxygen Flow Blinker. |
| 2. Oxygen Cylinder Cover. | 6. Oxygen Pressure Gage. |
| 3. Hood Emergency Release Handle. | 7. Cockpit and Instrument Lights Circuit Breaker. |
| 4. Oxygen Regulator. | 8. Instrument Lights Rheostat. |

Figure 58B—Radar Operator's Cockpit—L.H. Side (F7F-4N Only)



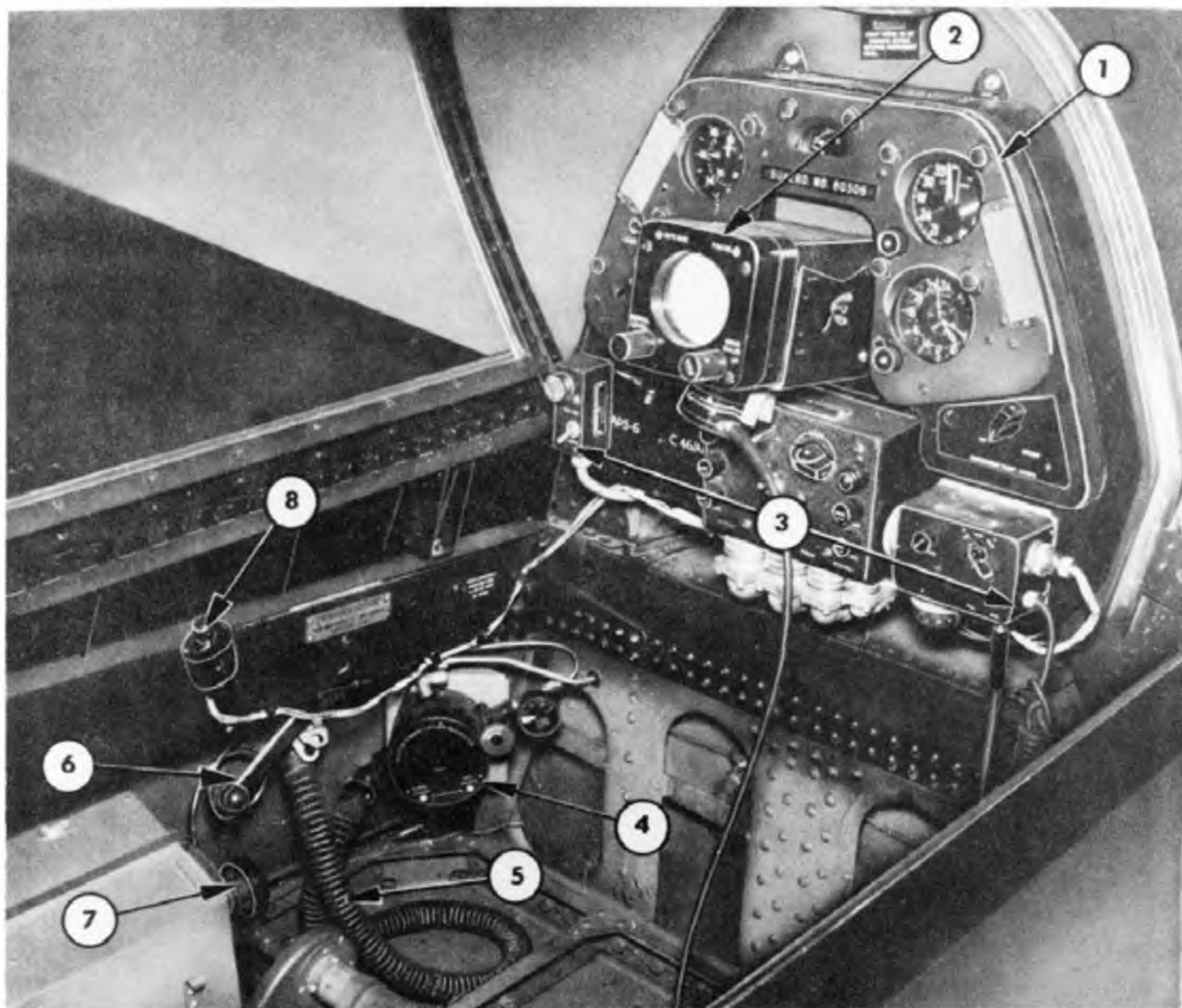
1. Seat Frame.
2. Safety Belt and Shoulder Harness.
3. Map Case.
4. Relief Tube.
5. Radar Antenna Tilt Control (BC-1341)

Figure 58C—Radar Operator's Cockpit—R.H. Side (F7F-3N Only)



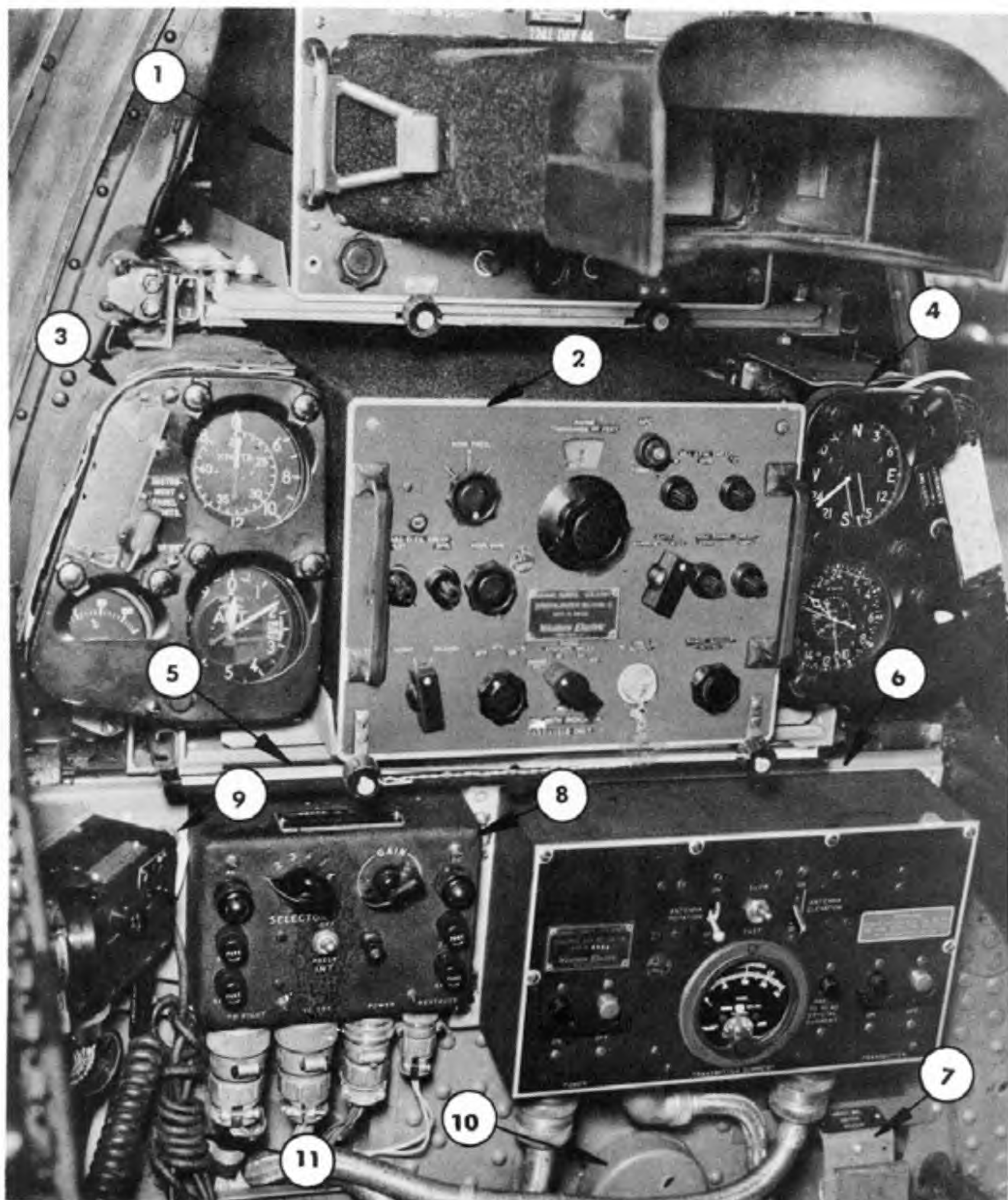
1. IFF Control Unit (C-56/APX-2)
2. Seat
3. Relief Tube

Figure 58D—Radar Operator's Cockpit—R.H. Side (F7F-4N Only)



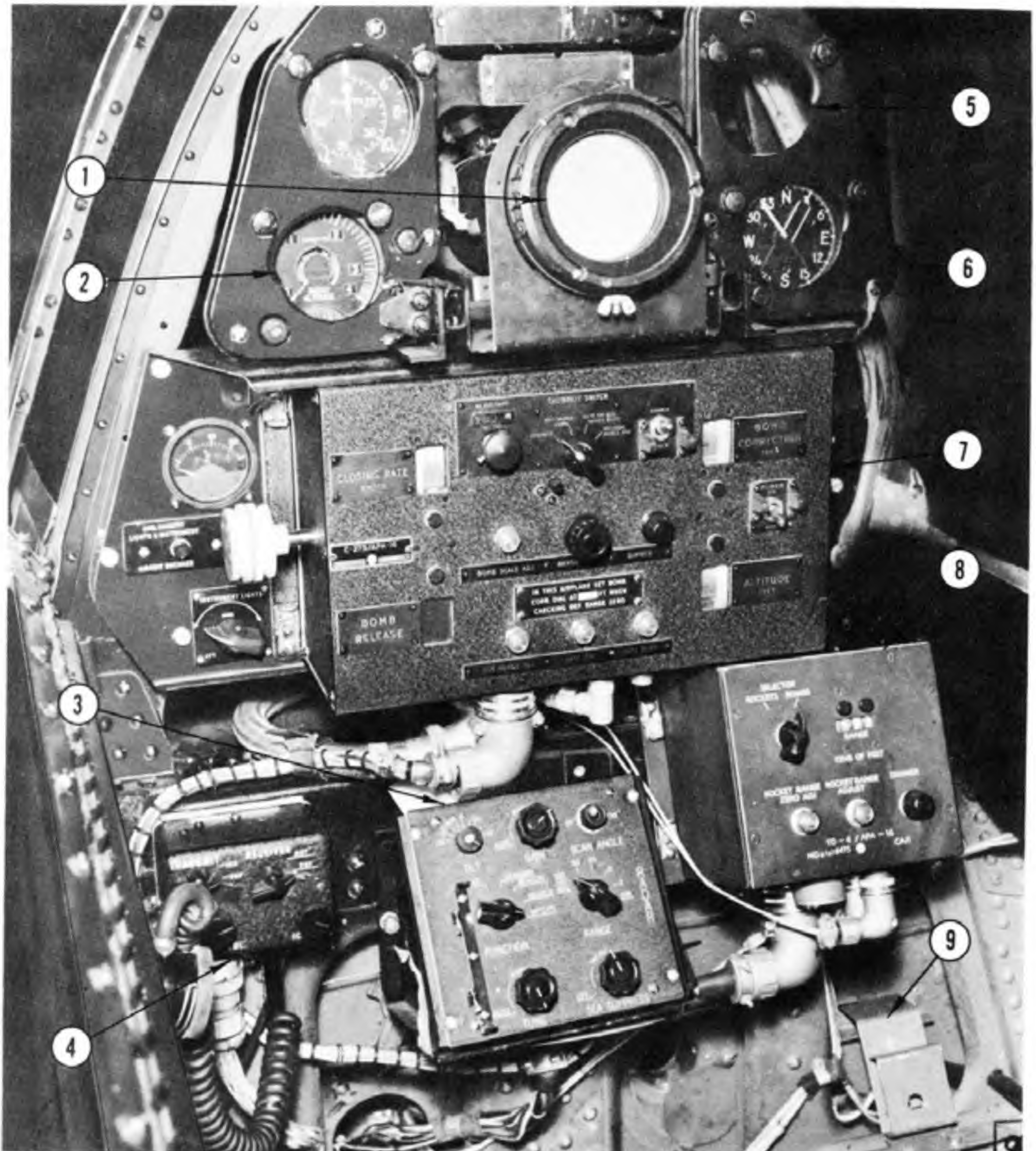
1. Instrument Panel
2. Radar Indicator (ID-32/APS-6)
3. Radar Auxiliary Control (C-47/APS-6)
4. Radar Main Control (C-46/APS-6)
5. Hand Microphone
6. IFF Control Unit (C-56A/APX-2)
7. Transmitter Control Unit (C-39/ARC-5)
8. Oxygen Regulator
9. Tubing to Oxygen Mask
10. Cockpit Hood Emergency Release Handle
11. Oxygen Bottle Valve Control
12. Microphone Switch

Figure 59—Radar Operator's Cockpit—Looking Forward (F7F-2N Only)



- | | |
|------------------------------------|---|
| 1. Radar Indicator (BC-1151-B) | 8. IFF Control Unit (C-56A/APX-2) |
| 2. Radar Synchronizer (BC-1148-D) | 9. Radio Control Unit (C-39/ARC-5) |
| 3. Left Instrument Panel | 10. Cockpit Heater Control |
| 4. Right Instrument Panel | 11. Mask Microphone Cord |
| 5. Chart Board | 12. Radar Antenna Tilt Control (BC-1341) (Not shown—
See Fig. 58C) |
| 6. Main Radar Control (BC-1342) | |
| 7. Foot Operated Microphone Switch | |

Figure 59A—Radar Operator's Cockpit—Looking Forward (F7F-3N Only)



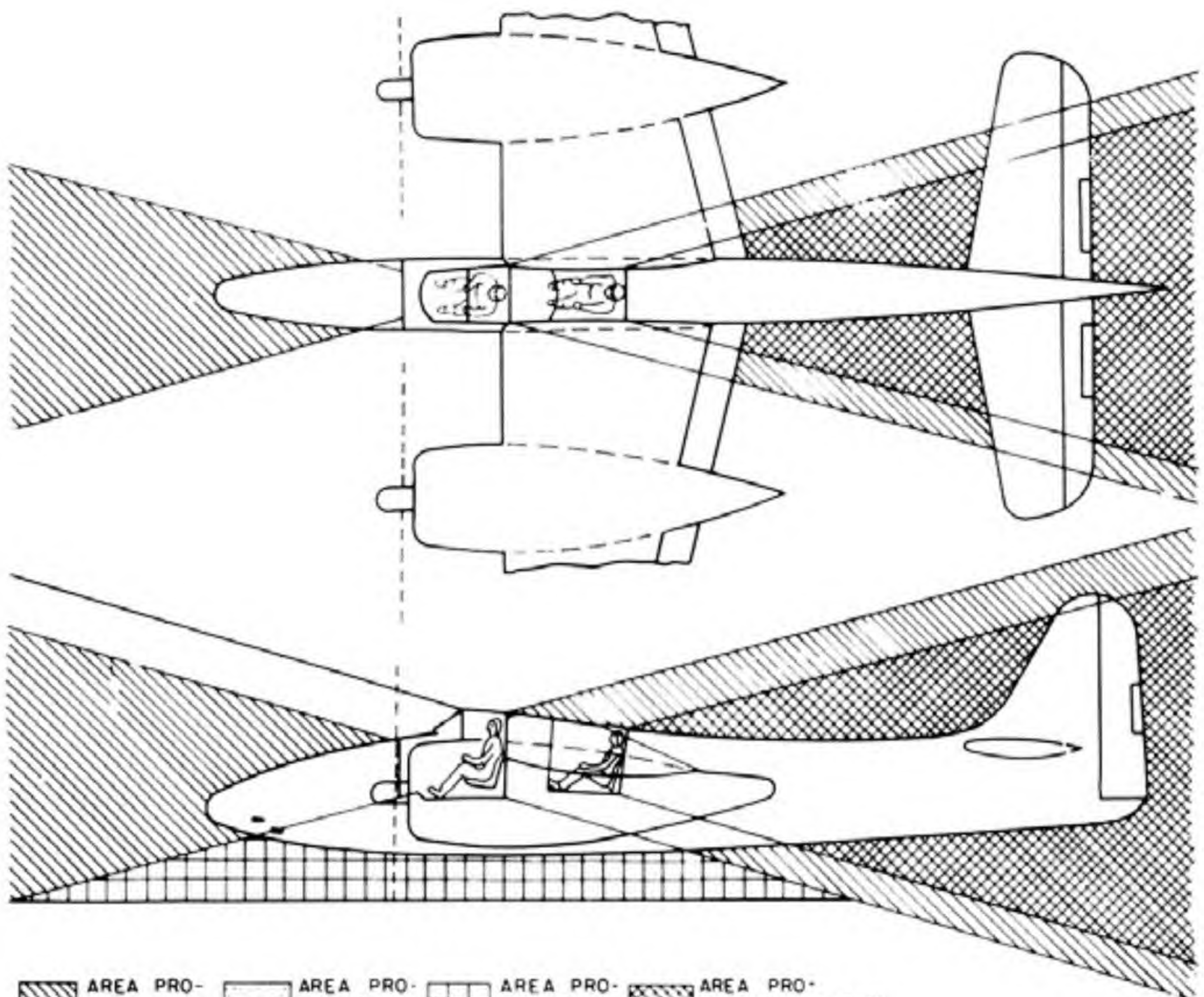
- | | |
|--|---------------------------------------|
| 1. Radar Indicator (ID-158/APS-19) | 6. Instrument Panel |
| 2. Radio Altimeter Repeat Indicator (ID-14B/APN-1) | 7. L.A.B. Control Unit (C-275/APA-16) |
| 3. Radar Control Unit (C-282/APS-19) | 8. Rocket Adapter Unit (TD-6/APA-16) |
| 4. Radio Control Unit (C-174/AIC-4) | 9. Foot Operated Microphone Switch |
| 5. Space Provision for RADCM Homing Equipment | |

Figure 59B—Radar Operator's Cockpit—Looking Forward (F7F-4N Only)

RESTRICTED
AN 01-85FA-1

Appendix I

APPENDIX





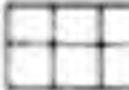

- | | | | | | | | |
|---|---|---|---|---|---|---|--|
|  | AREA PRO-
TECTED BY
3/8" & 1/2"
FACE HARD
ARMOR PLATE |  | AREA PRO-
TECTED BY
1/4" ALUM.
ALLOY DECK
PLATE & BULLET
RESISTANT GLASS |  | AREA PRO-
TECTED BY
5/8" ALUM.
ALLOY (FROM
GROUND FIRE) |  | AREA PRO-
TECTED BY 3/8"
& 1/2" FACE HARD
ARMOR PLATE (SECOND
COCKPIT PROTECTION F7F-2N) |
|---|---|---|---|---|---|---|--|

Figure 60—Protection from Gunfire Diagram

RESTRICTED

AN 01-85FA-1

Appendix I

TAKE-OFF, CLIMB & LANDING CHART

AIRCRAFT MODEL(S)

ENGINE MODEL(S)

177

R-1800-12W

TAKE-OFF DISTANCE FEET

GROSS WEIGHT LB.	HEAD WIND		HARD SURFACE RUNWAY						SOO-TURF RUNWAY						SOFT SURFACE RUNWAY					
			AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET	
			GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.
25800	0	0	1050																	
23725	0	0	875																	
21650	0	0	725																	
25800	17.4	15	780																	
23725	17.3	15	625																	
21650	17.3	15	510																	
25800	18.8	25	580																	
23725	18.8	25	470																	
21650	18.8	25	380																	

NOTES: INCREASE CHART DISTANCES AS FOLLOWS: 10% + 10% (10% + 10%); 10% + 10% (10% + 10%); 10% + 10% (10% + 10%)
DATA AS OF 12-15-44 BASED ON:

OPTIMUM TAKE-OFF WITH 10% INCL. S. 10% CL. 10% IS ONE OF CHART VALUES

CLIMB DATA

GROSS WEIGHT LB.	AT SEA LEVEL				AT 5000 FEET				AT 10,000 FEET				AT 15,000 FEET				AT 25,000 FEET				AT 35,000 FEET			
	BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB		BEST I.A.S.		RATE OF CLIMB	
	MPH	KTS	FT. PER MIN.	FUEL USED	MPH	KTS	FT. PER MIN.	FUEL USED	MPH	KTS	FT. PER MIN.	FUEL USED	MPH	KTS	FT. PER MIN.	FUEL USED	MPH	KTS	FT. PER MIN.	FUEL USED	MPH	KTS	FT. PER MIN.	FUEL USED
25800	140	166	2085	28	181	167	2480	1.8	172	149	1960	4.0	167	145	1850	6.8	147	128	700	14.3				
23725	140	166	2005	28	181	167	2000	1.8	172	149	2450	3.3	167	145	2350	5.4	147	128	1100	11.1				
21650	140	166	4150	28	181	167	3000	1.4	172	149	2900	2.9	167	145	2800	4.8	147	128	1480	9.2				

POWER PLANT SETTINGS: (DETAILS ON FIG. 36 SECTION 1111)

DATA AS OF 12-15-44 BASED ON:

FUEL USED (U.S. GALS.) INCLUDES WARMUP & TAKE-OFF ALLOWANCE

LANDING DISTANCE FEET

GROSS WEIGHT LB.	BEST IAS APPROACH				HARD DRY SURFACE						FIRM DRY SOO						WET OR SLIPPERY					
	POWER OFF		POWER ON		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET		AT SEA LEVEL		AT 3000 FEET		AT 6000 FEET	
	MPH	KTS	MPH	KTS	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.	GROUND ROLL	TO CLEAR 50' OB.

DATA AS OF 12-15-44 BASED ON:

OPTIMUM LANDING IS ONE OF CHART VALUES

REMARKS: TAKE-OFF FIGURES FOR FULL FLAPS (-40°) CONDITION

LEGEND

NOTE: TO DETERMINE FULL CONSUMPTION IN BRITISH IMPERIAL GALLONS, MULTIPLY BY 10, THEN DIVIDE BY 12

I.A.S. - INDICATED AIRSPEED
M.P.H. - MILES PER HOUR
KTS. - KNOTS
FT. PER MIN. - FEET PER MINUTE

Figure 61 (Sheet 1 of 2 Sheets)—Take-Off, Climb and Landing Chart

RESTRICTED

Revised 1 July 1949

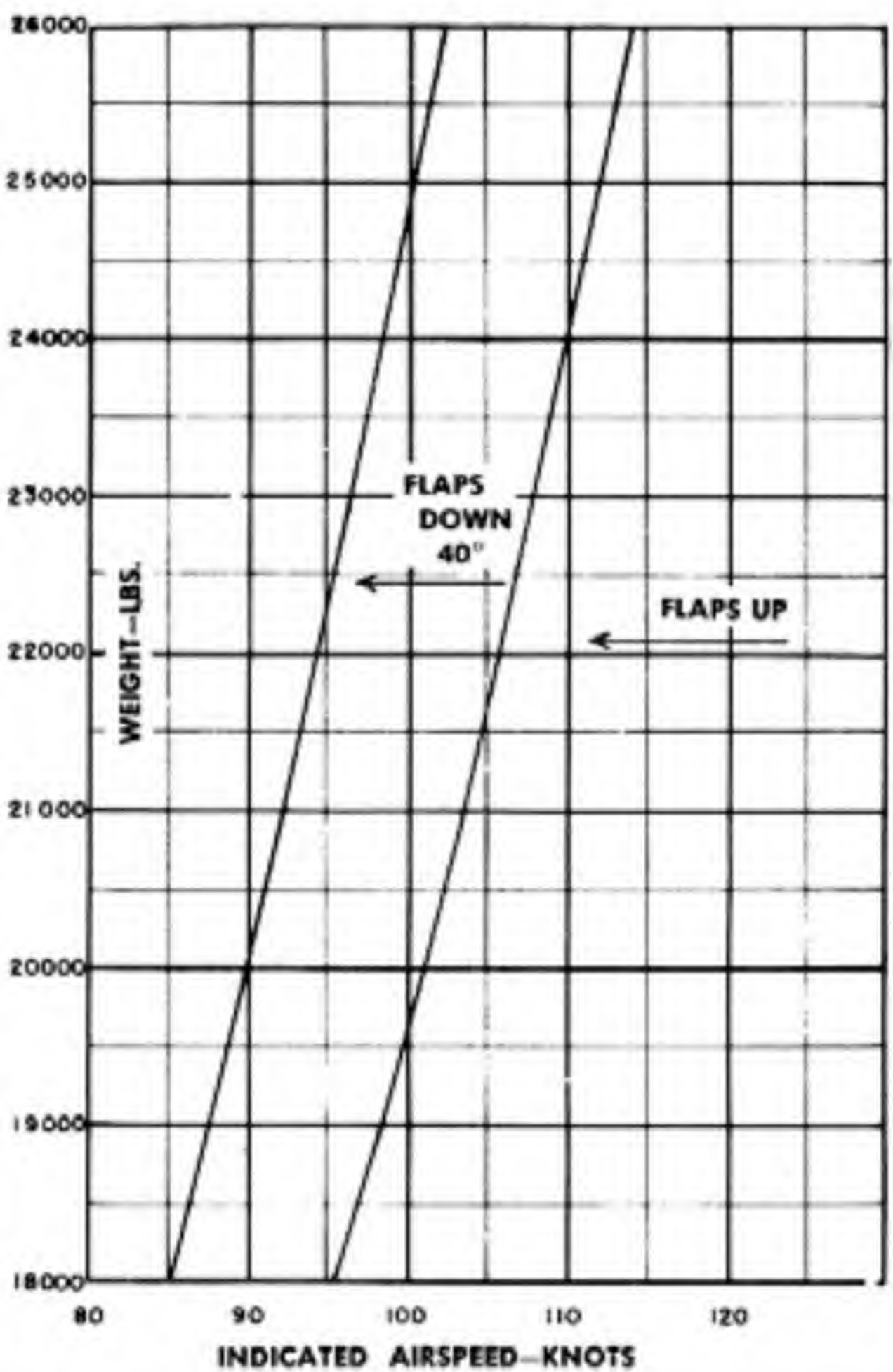


Figure 64—Stalling Speed vs. Weight (Power Off)

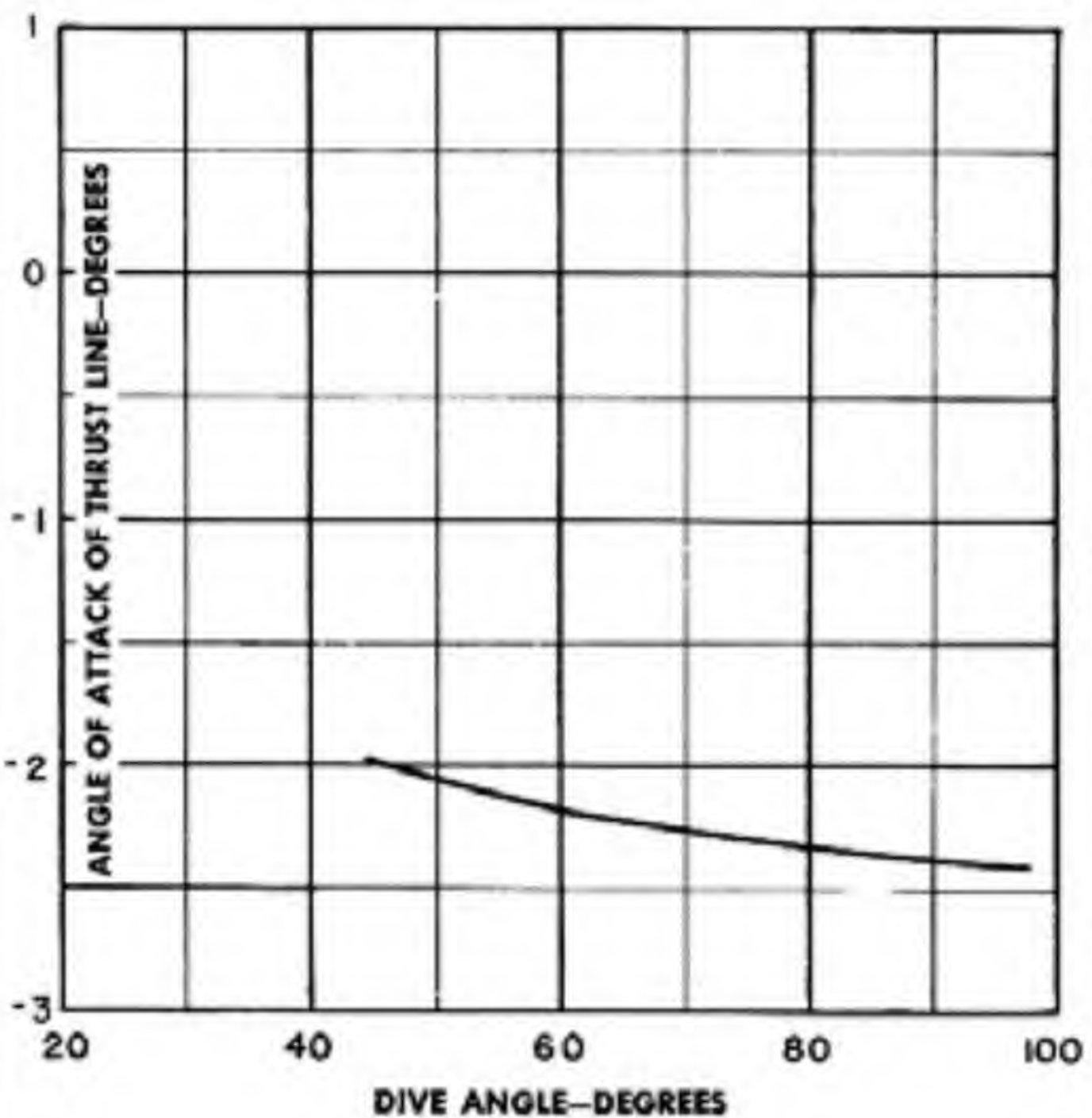


Figure 63—Dive Angle vs. Angle of Attack

RESTRICTED
AN 01-85FA-1

Appendix I

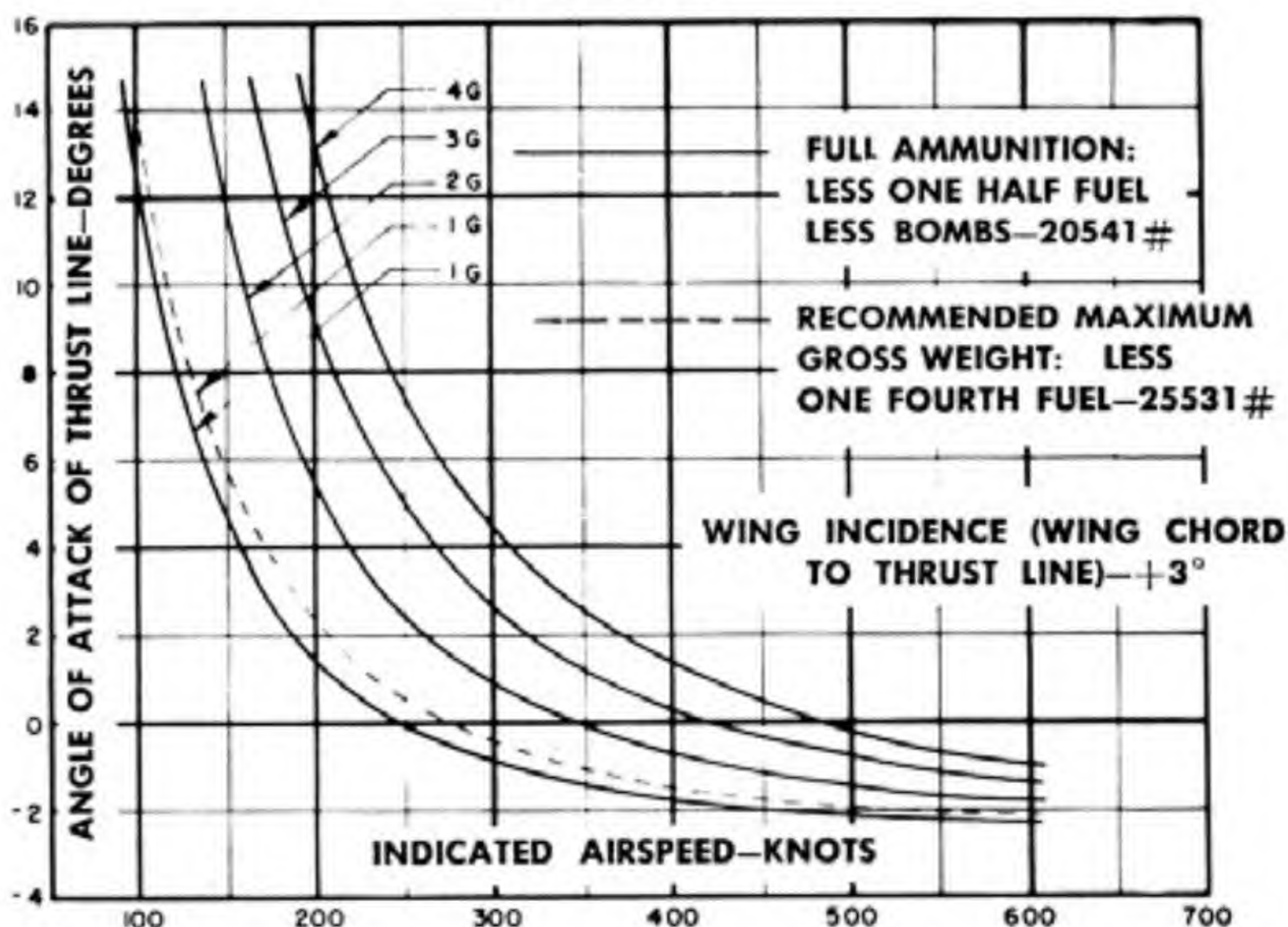


Figure 65—Angle of Attack vs. Indicated Airspeed (F7F-1 Day Fighter)

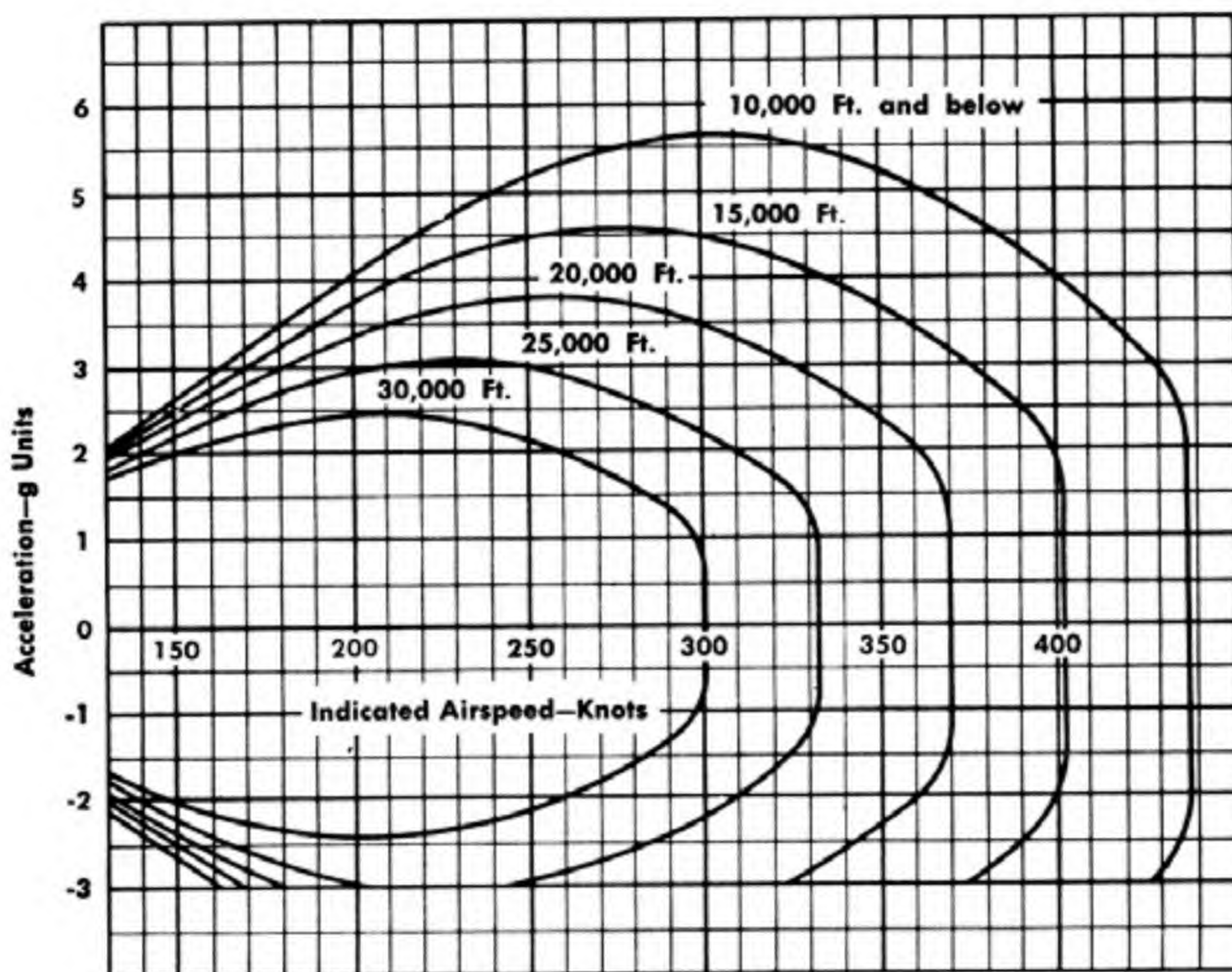


Figure 66—Operating Flight Strength Diagram (Gross Wt. 21,000 lbs.)

RESTRICTED
AN 01-25FA-1

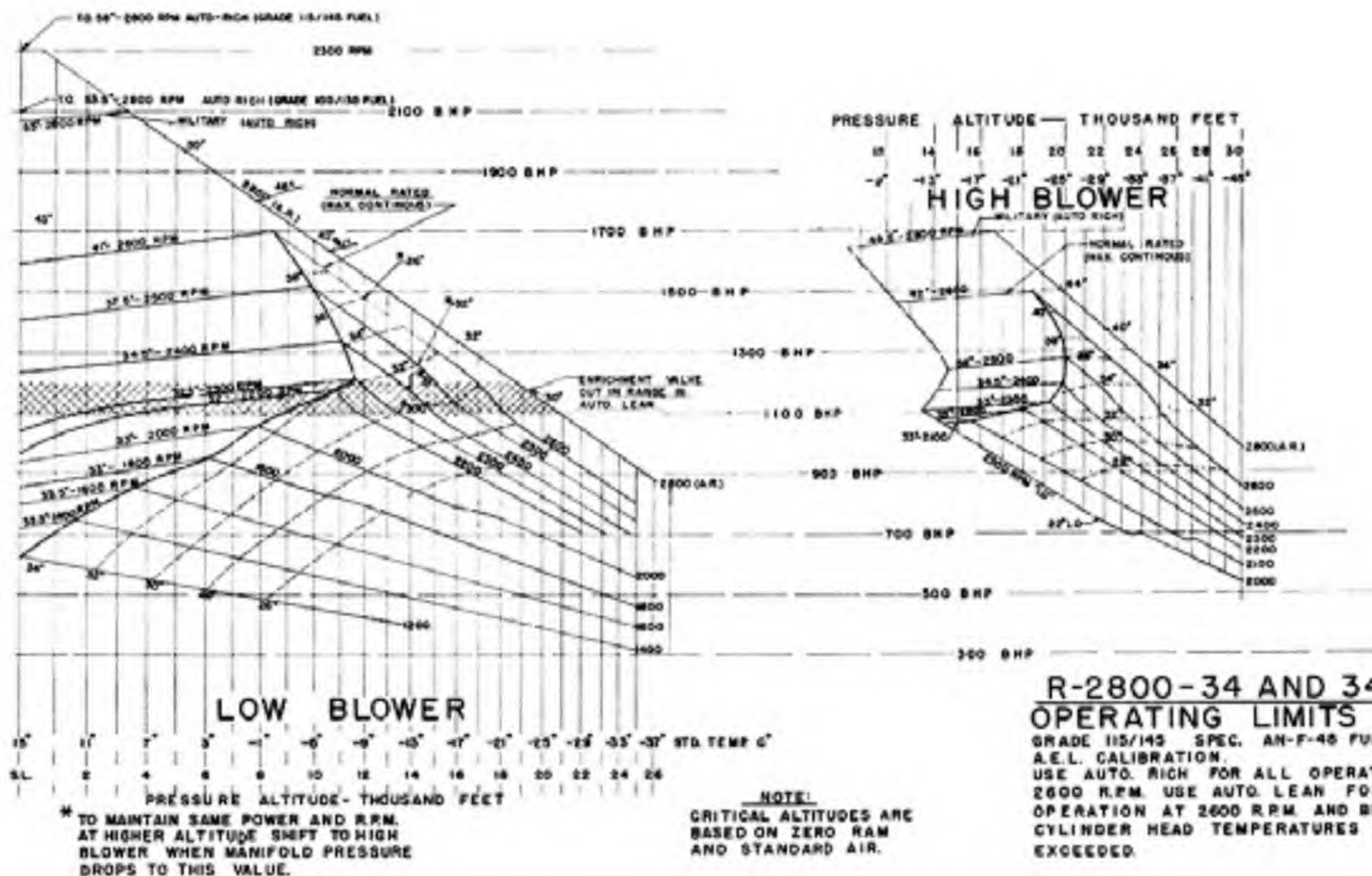


Figure 47 (Sheet 1 of 2 Sheets)—Engine Calibration Curves

RESTRICTED

RESTRICTED
AN 01-85FA-1

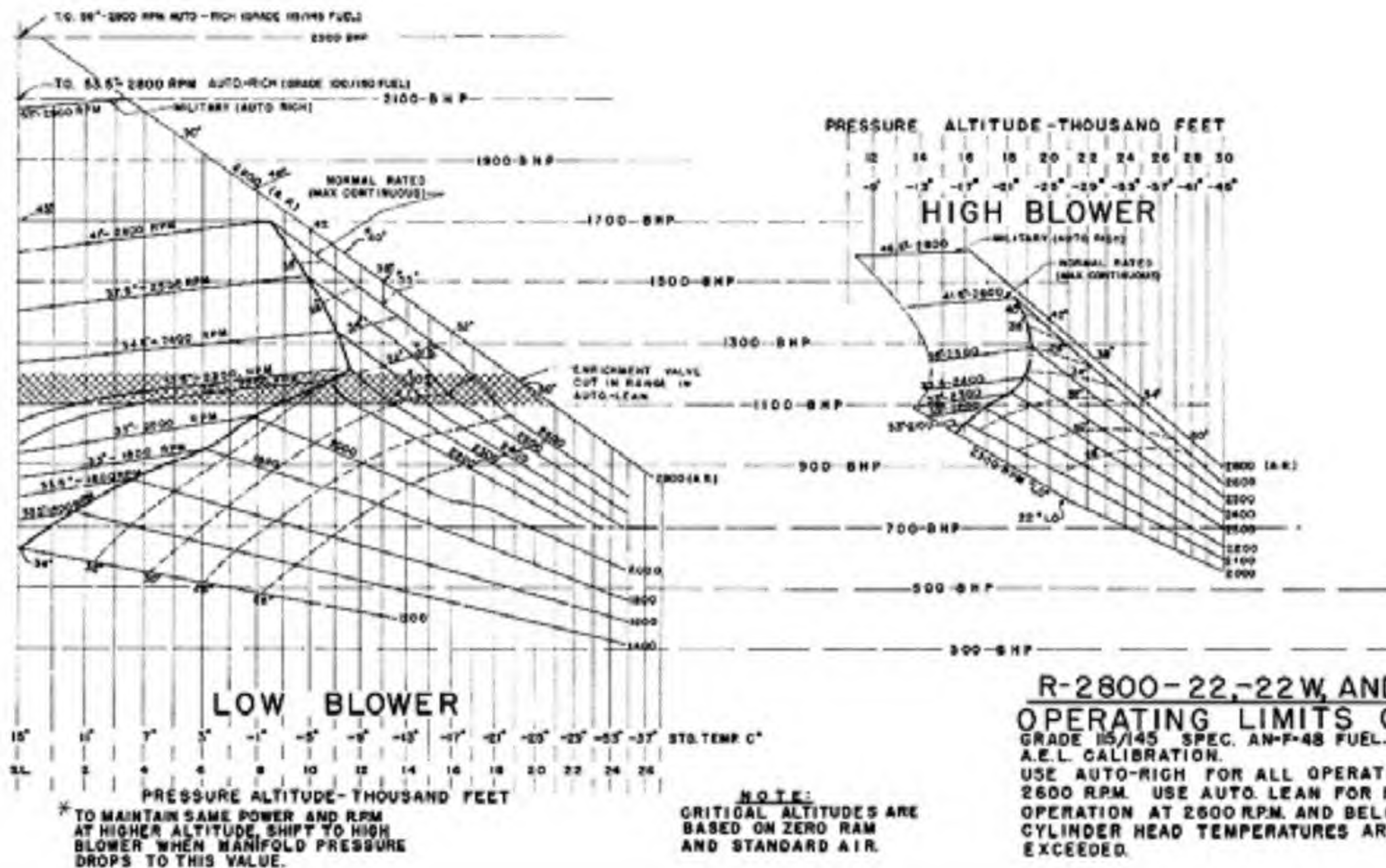


Figure 47 (Sheet 2 of 2 Sheets)—Engine Calibration Curves

RESTRICTED